VOL. LI.
New Series Vol. 4, No. 1.

APRIL, 1917

$3.00 per Annum.
Foreign, $3.60. Canada, $3.35.
Single Copies, 30 Cents in U. S.

JOURNAL
OF THE
American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW
(Original Official Organ U. S. Vet. Med. Ass'n)
EDITED AND PUBLISHED FOR
The American Veterinary Medical Association by Pierre A. Fish, Ithaca, N. Y.

OF CONGRESS
APR 2 1917
EXHIBITION

Executive Board

F. TORRANCE, 1st District; W. HORACE HOSKINS, 2d District; J. R. MOHLER, 3d District; C. H. STANGE, 4th District; R. A. ARCHIBALD, 5th District; V. A. MOORE, Member at large and Chairman.

Sub-Committee on Journal

F. TORRANCE, J. R. MOHLER, R. A. ARCHIBALD

CONTENTS

	PAGE
Editorial	1
European Chronicles	6
Anaphylaxis in Cattle and Sheep Produced by Larvae of *Hypoderma Bovis*, *H. Lineatum* and *Oestrus Ovis*. Seymour Hadwen and E. A. Bruce	15
Nymphomania of Mares. H. Fulstow	45
Removing Retained Placentae by Injecting Placental Vessels with Saline Solution. R. R. Shaw	60
The Etiology of Hog Cholera. Frederick Proescher and Harvey A. Seil	64
The Action and Control of Animal Parasites with Special Reference to the Intestinal Canal. R. P. Lyman	70
Periodic Ophthalmia. R. F. Avery	78
"'Contagious Abortion' Infections of Animals and Man". G. A. Roberts	81
Clinical and Case Reports:	
Formalin in the Treatment of Mastitis. J. N. Frost	85
Forage Poisoning. C. T. Fake	89
Prevention and Treatment of Hemorrhagic Septicemia of Cattle by the Use of Bacterial Vaccine made from the Causative Agent. T. O. Brandenburg.	93
Chlorinated Lime in Practice. N. A. Kippen	93
Productive Inflammation of the Fowl Due to Trauma. B. F. Kaupp	94
Double Fracture of the Pelvis. D. O'Loughlin	97
An Interesting Case in Comparative Medicine. F. W. Porter	97
Abstracts from Recent Literature	100
Association Meetings	114
Communications	139
Reviews	143
Necrology	146
Miscellaneous	146

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION is issued the first of each month. *Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the 10th of the preceding month to insure insertion in the next month's issue.* Volumes begin in April and October.

Communications relating to publication, subscriptions, advertisements and remittances should be addressed to JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, ITHACA, N. Y.

Entered at the Post Office at Ithaca, N. Y. as Second Class Matter.

The remarkable success of the Veterinary Phylacogens.

In the four and one-half years that have elapsed since their introduction, **Pneumonia Phylacogen (Veterinary)** and **Mixed Infection Phylacogen (Veterinary)** have more than fulfilled the promises that were made for them. As to the therapeutic value of these products there is no room for question. Upon this point our files contain a mass of case-report evidence that banishes skepticism. Repeatedly it has been chronicled that apparently hopeless cases have shown prompt and marked improvement under Phylacogen treatment—many valuable animals, whose loss seemed a foregone conclusion, being eventually restored to normal health.

Veterinary Phylacogens need no encomiums. All over the world veterinarians are using them with distinct satisfaction. Only in a small percentage of cases, when administered as indicated, have these products failed to produce the desired results. Given a correct diagnosis, success with Phylacogens is reasonably assured.

PNEUMONIA PHYLACOGEN
(VETERINARY)

Indicated in the treatment of all cases of acute and chronic pneumonia and their complications.

Bio. 950. Bottles of 30 mils (Cc.). List price, per bottle, $1.50.

MIXED INFECTION PHYLACOGEN
(VETERINARY)

Indicated in the treatment of strangles, abscesses, quittors, fistula of the withers, poll evil, pyemic arthritis, scirrhous cord and all other suppurative conditions.

Bio. 960. Bottles of 30 mils (Cc.). List price, per bottle, $1.50.

We are always ready to be of assistance to veterinarians with respect to Phylacogen therapy. If detailed and specific information is wanted upon any point, write to us. Our veterinary staff is at your service.

Home Offices and Laboratories,
Detroit, Michigan.

Parke, Davis & Co.

50 Years of Pharmaceutical Progress

JOURNAL
OF THE
American Veterinary Medical Association
Formerly American Veterinary Review
(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor **ITHACA, N. Y.**

Executive Board

F. TORRANCE, 1st District; W. HORACE HOSKINS, 2d District; J. R. MOHLER, 3d District; C. H. STANGE, 4th District; R. A. ARCHICALD, 5th District; V. A. MOORE, Member at large and Chairman.

Sub-Committee on Journal

F. TORRANCE, J. R. MOHLER, R. A. ARCHIBALD

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Fifty reprints, without charge, if requested in advance, will be furnished to authors of original articles accepted for exclusive publication.

VOL. LI., N. S. VOL. IV. APRIL, 1917. NO. 1.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merillat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

ARMY VETERINARY SERVICE

To the Members of the American Veterinary Medical Association and the Veterinary Profession:—In view of present conditions and the possibility that our country may be forced into the awful world war, we, as a profession, must show our loyalty and do our part in preparedness.

After consultation with the executive board and other members of the association, I have asked Dr. C. J. Marshall, of Pennsylvania, to act as chairman of a special committee on "Army Veterinary Service", and requested him to name the other members of the committee. He has named as his associates Veranus A. Moore, J. P. Turner, F. A. Bolser and Secretary L. A. Merillat. Dr. Marshall spent last summer in England and France studying the organization of the veterinary corps in the allied armies and is familiar with modern army veterinary organization. Congress has at last recognized our profession, and the medical corps of the army is now organizing the veterinary branch. The committee can be of assistance in such re-organization.

If our country is drawn into this war, many more veterinarians will be required in the regular organization and it will be neces-

sary to have a large reserve corps. The medical profession has started the organization of a reserve corps and I am sure our profession will show as much loyalty and patriotism. Dr. Robert V. Agnew, of the 5th Cavalry, some time ago succeeded in getting a number of veterinarians to volunteer their services in case of war. With the army veterinarians and all members of our profession working in harmony, we will succeed in getting something tangible which will be of material service to the committee and the medical corps in the organization of a reserve corps.

I appeal to all eligible men in the profession, who are so situated that they can volunteer their services to our country in case of need, to immediately send their names to the chairman of this committee, Dr. C. J. Marshall, 39th and Woodland Ave., Philadelphia, Penn. CHARLES E. COTTON, President.

THE BLUE CROSS AND THE RED STAR

The humanitarian work of the Red Cross organization in times of war or other catastrophes is too well known to require elaboration. The unselfish devotion of its members in performing work of mercy and relief to the stricken appeals to all. Equally exposed to disease, danger and suffering in a period of war is man's faithful friend—the horse. Until a comparatively recent period, there has been no organized effort to alleviate the sufferings of our faithful friend in a way commensurate with his services nor comparable to the relief administered to his master. In order to remedy this defect there was formed, at about the time of the Balkan War, an organization known as the Blue Cross, the purpose of which was to accomplish for the horse what the Red Cross has accomplished for the soldier. As to the manner and details of the organization we have no information, but indications point toward the humane societies as being actively interested and probably the originators of it.

Although the blue cross seems to have priority in the field of operations, as regards animal relief in time of war, its insignia seems to have been ignored or supplanted at a meeting held at Geneva, Switzerland, December 1914, for the purpose of making the movement international in character, and the adoption at that meeting, of the red star as its emblem. In the German and Austrian veterinary field hospitals, it is said, the red star flag is now in use.

The Royal Society for the Prevention of Cruelty to animals, the parent organization of all anti-cruelty work in the world, offered its services to the British army at the outset of the war. These were, at first, rejected as the Army Veterinary Corps seemed well enough equipped to deal with the situation. After three months of unusual stress the offer of assistance was accepted and there has since been harmonious co-operation between the two organizations Another English organization, the blue cross, a branch of the Dumb Friends League, has received no recognition from the British Army, but has devoted its relief work mainly to the French and Italian Armies. Although receiving no official recognition, the blue cross organization established a few base hospitals in France at the beginning of the war, when the French veterinarians were inadequately prepared, and cared for many horses before the regular army service was equipped for the purpose. The assistance has been continued but not under military regulations, and its efficiency is considered inferior to that of the English system of military administration.

Last May the American Humane Association accepted an invitation from the Secretary of War to undertake the work of volunteer relief for animals employed during war times in the United States Army, in connection with the regular veterinary department of the service. For this branch of their work they have adopted the name of the American Red Star Animal Relief. Since its organization many prominent individuals have become connected with it, and numerous local branches have been established. A special representative has been sent to the Mexican border to investigate the condition of the army horses, and a report has been prepared and submitted to the War Department. At the present time, it would appear that we have the blue cross as the emblem adopted by the A.V.M.A., and probably by other veterinary organizations, as the equivalent of the red cross, and the red star adopted by an American humane society as the same equivalent.

Standing in the shadow of a world war, the matter of preparedness is of vital interest. Physicians and veterinarians are co-workers in the conservation of human and animal life. The medical branch of the army has had official recognition and rank for many years. It has developed efficiency because of this fact; until the last year the army veterinarian has been denied official recognition. He has had the allowance of a second lieutenant

without authority. He has been under the jurisdiction of the Quartermaster's department, under the authority of laymen who could not distinguish between milk sugar and the deadly night shade. There has been little time for veterinary preparedness, and because of inadequate numbers and lack of official authority there has not been the maximum of efficiency.

Under the reorganized army bill passed a year ago, conditions have improved and the future offers more promise. Rank up to and including the office of major has been granted to the veterinary service and not least in the advantages gained has been the separation of the corps from the Quartermaster's department and its affiliation with the medical branch. This arrangement is in vogue in Russia and it is said to be effective. Some day our veterinary branch may become an independent corps as in some of the other enlightened nations. In the meantime with the medical corps standing by us as a big brother the outlook is hopeful.

With Russia as the only exception, the United States is the greatest producer of horses in the world. It has been estimated that out of 22,000,000 horses in this country, only 224,000, about 1% are of a type suitable for military purposes. In necessity, many others doubtless could and must be used, although not conforming to military standards. We are proficient in quantity, but deficient in quality. Our impairedness is illustrated by the fact that during one year of the Civil War the government purchased 221,000 mounts and to further emphasize our impairedness 611,700 horses and 167,387 mules have been sold to foreign agents during the first twenty-two months of the war. An unfortunate feature of this transaction is the large number of valuable mares that have been transported and lost to this country for breeding purposes. Our military authorities discountenance the use of mares in our army although they are equal if not superior to geldings for army purposes, a fact well known and utilized by the foreign armies.

A year ago our supposed army of 100,000 men included 15 cavalry and six artillery regiments, two veterinarians being attached to each regiment, a total of 42 veterinarians. Two veterinairans and two or three stable orderlies had charge of the health of a thousand horses. In the British veterinary corps in the present war we understand there are 382 men detailed to care for the same number of animals. Twenty years ago the British veterinary service was probably not much superior to our own. They

received their lesson in the Boer war. There was an appalling waste of animals and much financial loss to the government. Many of the horses abandoned by the British were carefully nursed back to health by the Boers and used against their former owners. Now the British system is considered one of the best and the efficiency of its veterinary corps has been remarkable. Of the first 100,000 horses that passed through the veterinary hospitals more than 70% were returned to the army, in many cases, in better condition that when first purchased. With increased experience even better results are being attained. Glanders, the great bane of horses in previous wars, is no more of a menace now than typhoid is among the soldiers.

The possibility that this country might be drawn into the war has existed from the first. There have been two and a half years during which some adequate preparation might have been made. But little change has appeared on the surface; deeper than official reticence, is to be hoped that forces have been at work to safeguard our honor and protect such treasure as we possess.

P. A. F.

THE VETERINARY REVIEW

Number one of volume one of the *Veterinary Review* under date of February 1917 has reached our desk. It is a quarterly publication edited by O. Charnock Bradley, M.D., D.Sc., M.R.C.V.S., of Edinburgh, Scotland. The number contains 102 pages, after the Foreword and an article by Professor Linton on "Feeding and Economy", the remaining pages are given up to abstracts, reports, reviews, notes on books and bibliography of veterinary literature. We are told in the Foreword that in 1914 there were about a hundred periodicals professedly devoted to veterinary science in one form or another. Aside from the question of expense, it is obvious that it is practically impossible for a veterinarian to keep in touch with all that is going on in his chosen field. Particularly is this true when we consider the fact that there are many articles of importance in the veterinary field which appear in many periodicals not especially devoted to veterinary work.

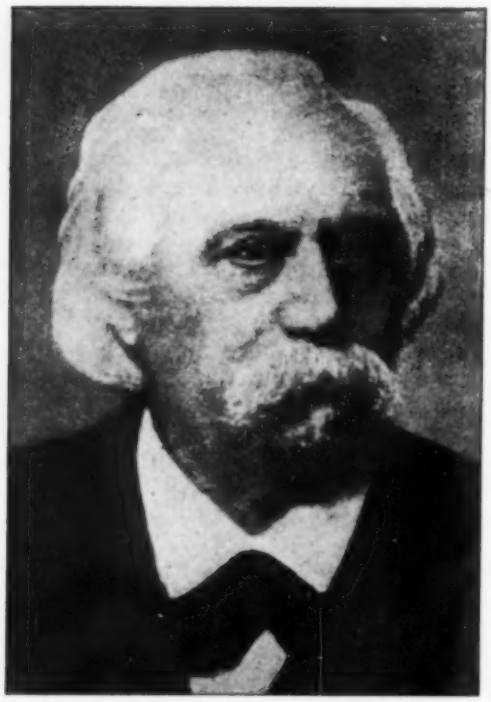
The effort to correlate this great amount of material, and to present it in concise and available form to the veterinary profession, is a work of great merit and should receive the hearty and appreciative support of all veterinarians who desire to keep up to date.

P. A. F.

EUROPEAN CHRONICLES

Bois Jerome.

DR. A. CHAUVEAU.—Although the death of this illustrious veterinarian has been known for some time, and while much that could be written of him has been published, the readers of the *Journal* will appreciate that if I appear late in paying my tribute to this great scientific figure, the peculiar circumstances of distance and my opportunities to correspond with them is my excuse for my concise remarks, which with the accompanying likeness I am able to send at this time.



Auguste Chauveau

The great master of French physiology, the scientist who, with Marey, created the graphic method; who laid the angular stone upon which rests the physiology as well as the pathology of the heart; who fixed the mechanism of muscular energy; who among the first undertook the study of viruses; has died at the age of 89 years.

To the end of his life, Chauveau enjoyed an astonishing activity. He worked continuously, looking for new researches, re-

viewing and completing his past work. His mind was strong with the energy and activity of his youth. His knowledge and erudition were such that he could still follow the various and great strides of biology, and yet he remained a valuable guide for the younger men, who attempted to follow him and his investigations in physiology.

Born on the 23d of November 1827, Chauveau entered Alfort in 1844. He graduated in 1848 and the same year was appointed Adjunct at Lyon where, in 1863, he became professor of anatomy and physiology. In 1875 he was named director of the school. In 1877 he graduated as a physician after having already occupied the chair of experimental and comparative pathology at the faculty of medicine of Lyon. When Bouley died in 1886, Chauveau was called to Paris and appointed General Inspector of the veterinary schools of France. Successively we see him professor of comparative pathology to the museum of natural history, titular member of the Academy of Medicine, of which he became president. He was a member of the Academy of Sciences and of the Society of Biology. He had for years been a member of the Societè Centrale de Médécine Vétérinaire of Paris. He belonged also to many other scientific bodies. Among the foreign countries which wished to count him among their members, the American Veterinary Medical Association was one which was honored by his honorary membership.

Circumstances and space do not allow me to say more of the great loss that French science has sustained by the death of Chauveau. In another communication I hope to be able to offer the readers of the *Journal* a list of the works published by Chauveau and the titles which have won for him the admiration of the scientific world at large.

A further account of the work of this illustrous veterinarian is given in the following pages.

Air Cure in Mange.—Among the various diseases which have been most troublesome in the armies engaged in the present conflict, at least in the French cavalry, mange is one which has required the application of the most severe measures. Placed in the list of contagious diseases, the regulations to prevent spreading and, in the present occurrence, possible detrimental effects, were most severe and their application quite difficult. The disease is very

liable to spread, animals have to be isolated, therapeutic applications are, to say the least, most generally of little avail. To control the affection and prevent dangerous epizootics have kept army veterinarians very busy.

In the *Revue Generale,* Principal Veterinarian Berton has an article which is of great value and brings out in the management of mange and its treatment, a natural aid which has generally been too much neglected.

The treatment of *mange by air cure* is certainly a therapeutic progress of no little value. A progress no doubt, for it shows that an animal affected with generalized mange, thin, poor in general condition, almost without the aid of any therapeutic agent, if placed in hygienic condition will get well of mange, while a subject suffering in the same manner, treated by the ordinary therapeutic agents, kept isolated between the four walls of a stable, will, for months and months after relapse on relapse, represent an animal whose absolute recovery will remain doubtful.

The proof of the above follows: Twelve animals were in a most pitiful state, they had patches of mange, widely spreading on the neck, withers, back, ribs and rump; they were constantly scratching. Arrived at the depot of sick and wounded, there was no room for them. They could not be admitted and they had to be isolated. A field was hired some distance from the depot and they were turned out there, with plenty of hay and oats. A little running water in the field gave them water to drink.

Two weeks later, there were possibilities of bringing them to other quarters, especially used for mangy horses, but they were exhibiting such evidences of improvement, that it was decided to let them remain a little longer in the same condition without medical attendance.

Result: after two months the twelve horses were perfectly cured, fat, full of energy and returned to their work.

A doubt, however, existed: the diagnosis of the condition of the animals, when entered for treatment, had not been made; the parasites had not been looked for.

Another squad of twelve mangy horses arrived. The parasites were looked for and found, and the twelve horses placed as the first had been, viz: at liberty night and day in the field, without being clipped, without cleaning, brushing or washing, but well fed and having free access to water.

At the beginning of this second experiment the condition of the horses was horrible, they had extensive patches of mange spread over a wide surface, sarcoptes, psoroptes, symbiotes had occasioned loss of hair on the whole body, the mane, the tail and the extremities.

After two months, ten of the horses were perfectly cured and ready to resume their work. The other two horses, old and worn out, had died during the experiment.

These two experiments were conclusive. In placing in evidence the great influence of the air-cure, which is the hygienic method, the related conditions must not, in ordinary practice, be considered as implying the neglect or suppression of the therapeutic treatment.

The experiments show the uselessness of interference which among other faults has that of promoting cutaneous irritation, therapeutic dermatitis, which for months disqualify unnecessarily animals which might have resumed their work earlier. All that is necessary is a few days of medical care in the stable and several weeks at liberty in fresh air.

Principal Veterinarian Berton divided the treatment of mange into two periods. The first embraces clipping, cleaning and removal from the skin of all scabs, etc., but no ointments, oils, grease or vaseline. Sprinkling with ward solutions is better. He recommends potassium sulphide at 2%–2½% renewed several times a day. This is the therapeutic period.

The second is the hygienic. Remove the shoes and let the horse run at liberty night and day, giving him plenty of good feed, hay and oats and access to water.

This method of treatment is simple and among its many advantages has that of acting directly on the acarus and on the soil, where it lives.

Castration of Mares.—Since the time Charlier devised his method of castration of cows, the operation has gradually found its application to the larger females and the results obtained by ovariotomy in mares as well known and sufficiently appreciated by veterinarians, who do not hesitate to perform it when indications are proper.

That it has not entirely taken the lead over the old fashion of operating by the flank for some classes of animals and in some re-

gions, is not to be ignored: nevertheless, with all the improvements made on the original method of Charlier, whether on instruments or other details, the general stages have remained the same, viz: the entrance to the ovaries by the vagina has always been obtained through the upper plane of the vaginal canal.

In the *Veterinary Journal*, of November, there is published by Dr. E. Graub, Army Veterinarian at Bern, an article entitled *A Modification in the Technique of the Castration of Mares*, which deserves attention.

First, the author remarks that today the operation of castration of mares is exclusively performed through the vagina, and that, with asepsis, it is the only method that offers security for a technically good result.

After a few remarks relating to the abuses of vaginal injections and fearing that the preparatory disinfection of the vagina can easily be carried too far, he recommends a preparatory disinfection to be carried out with consideration and moderation and the observance of asepsis as necessary for good results.

Measures are then advocated as to diet, the administration of chloral in some cases, the advantages for operating in the standing position, the emptiness of the rectum, disinfection of the vulva and vagina, all of which are essential. Then the author speaks of the operation. He makes the "vaginal puncture with a straight covered bistouri, attached to a chain. The blade must be broad and not sharper than a badly ground table knife. The perforation of the vagina by a puncture is preferable to an incision through the vaginal mucosa. In opposition to the general practice, he makes his opening in the vagina below."

The following is the description of his modus operandi. "The bistouri closed, pressed by the thumb against the outstretched fingers and introduced into the vagina, where the anterior edge of the pelvis is readily felt on the floor of the organ. The point of the fingers are placed under the external orifice of the uterus (os uteri) and pressed slightly cephalad, stretching the floor of the vagina. In the tense mucosa, the bistouri with the blade shoved forward by the thumb is thrust forward and downward. With the drawing back of the knife, the fore-finger is inserted into the punctured opening and the bistouri is removed by an assistant pulling on the chain attached to it. Successively when the fore-finger has been introduced through the vaginal opening the others are pushed in,

one after the other, until finally the whole hand is admitted. Entering the abdominal cavity with the palm of the hand turned upward the body of the uterus is felt, the bifurcation of both horns and by following one or the other, the ovary of the right and then of the left side is felt. Once located, their removal is simple, by the ecraseur.''

The aftercare is that generally applied.

The article of Dr. Graub concludes by the consideration of the advantages and disadvantages of the puncture of the vagina being made below. These are related at some length from the *Swiss Journal of Veterinary Medicine* which is credited with the original article. The conclusions drawn in favor of the operation are that the practical success was not as good as the surgical. Of twenty-one castrated mares, thirteen became quiet and useful and were no longer a source of danger. The percentage of mares made valuable from the previous condition is very encouraging.

Lameness and Subcutaneous Malleination.—Since the introduction of the palpebral intradermo malleination for the rapid diagnosis of glanders, the subcutaneous method is resorted to only for some specific indications, when doubtful signs are present. If with the subcutaneous malleination the signs of positive reaction are the heat, general and thermic reaction, there are many circumstances where these diagnostic symptoms are not always present with the characters described and admitted as classical, and no matter what care may have been taken, numerous are the cases where the clinician is embarrassed in making a decisive diagnosis. There are conditions where such are essentially necessary, a suspicious animal is always a dangerous one. It is therefore of the utmost importance for the practitioner to take advantage of any element of diagnosis that may be known. He must be acquainted with it and not neglect to give it the value that it deserves in connection with the injections.

It is with this object in view that Veterinary Major Fayet has in a communication to the Societe Centrale, called attention to *Lameness as a Diagnostic Sign in Subcutaneous Malleination.*

'The lameness or better the stiffness of the leg, corresponding to the seat of the edema, following a subcutaneous injection, whatever may be its intensity, its mode of manifestation, is one of the signs which to this day seems to have escaped the attention of veterinarians

This lameness, in general proportional in intensity, with the extent of the edema, its size, soreness or presence of lymphatic cords, is principally expressed by the reduction in the extension of the leg. The animal drags its toe, as in cases of lesions serious and deep of the superior region of the leg. He immobilizes its scapular region, holds it backward and in walking, moves sideways so as to rest more on the opposite member. It is when brought out of the stable, that this condition is noticed most, it diminishes after a few steps and may not be detected, even when the animal trots.

With severe local reactions, on the contrary, when the edema is thick and wide, with or without lymphatic cords, it is very marked, the carrying of the leg forward is very painful and, often when the animal is made to move on a half turn on the opposite leg, it is very painful for him to do so. In these cases, the lameness improves very little, when walking or trotting.

When there are lymphatic cords, the lameness is very great and the scapular region seems to be the seat of great pain.

Therefore, intensity of lameness, sensation of pain felt by the animal, lateral displacement and mode of resting the leg, are in general subjects for clinical appreciation, but not always in proportion to the extent of the edema.

These diagnostic signs are correlative with the effects of the local reactions upon the corresponding lymph glands at the seat of the injection, on the prepectoral, axillary or pre-scapular."

Having given the description of these manifestations of various degrees of lameness, Mr. Fayet concludes that so long as the clinical signs, already observed in a great number of reactions, and by which many doubtful cases became positive, it is not unimportant to have the subcutaneous injection made any where, but in a proper place, viz: toward the inferior third of the neck, some centimeters from the superior border, at the widest part but rather far from the anterior border of the scapula. It is indicated that the practitioner should satisfy himself of the gait of the horse previous to making the injection.

This addition to the means of diagnosis, in some doubtful instances, is certainly of great value when joined to the manifestations obtained by the classical operation of malleination.

Long Vastus Fibroma.—This is from a veterinarian in the Belgian army for which Prof. Cadiot has requested insertion in the *Bulletin of the Société Centrale.*

For Prof. Lineaux of Bruxelles the subject has been known for a long time, but the author has not seen any account of it in the more recent works in surgical pathology. All this taken into consideration justifies an extract from the original.

The expression *Fibroma of the Long Vastus* is no doubt better than the one *Fibroma of the Stifle*, although the latter is more explanatory of the seat of the lesion.

Fibroma of the long vastus is relatively rare. It is observed indifferently on draught or in saddle horses. Unknown in its etiology to the author, it has a constant seat, viz: the external face of the stifle region, opposite the inferior insertion of the long vastus (posterior portion of the superficial gluteus) upon the external patellar ligament.

The tumor is well defined on the region, seen full face principally during the flexion of the femoro-tibio-patellar articulation. It is apparent when examined from the side of the animal, and projects on the curve that the leg shows at that point.

The size may vary from that of a large nut to a mandarine or even an orange and has a more or less irregular globular form, being slightly flattened.

In an American mare, on which the author observed these neoplasms, there were four tumors arranged in the form of a square. In all the others he had seen, they were single; hard to pressure and painless. The environment of the tumor is well defined. The skin is movable over the growth and offers no cicatrix, recent or old.

It is difficult to appreciate by palpation the nature of the deep relations the growth may have and yet it is generally found that it has adhesions and may offer some surgical difficulty in its removal; although these are more apparent than real.

The fibroma of the long vastus does not give rise to any functional disturbances. To the esthetic point of view it is only an extremely unpleasant sight and is emphasized by the fact that it is a region where hydrarthrosis of the stifle appears. It is likely to give rise to error of appreciation which may be very unpleasant from a practical point of view.

Considerations of an esthetic nature are sufficient to justify an interference and to obtain the removal of the growth.

The operation required is the enucleation of the tumor. Operated standing, under cocaine, or in the recumbent position, the skin having been shaved and disinfected; an incision is made ver-

tically through the skin and the aponeurotic tissue underneath the tumor is thus exposed, secured with a pointed hook or forceps and dissected on its borders and deep face. If it is too large it may be divided in several pieces. Hemorrhage is of no consequence. The skin is secured and the wound closed with separate stitches. First intention cicatrization cannot be expected on account of the mobility of the region. The neoplasm seems to have its roots in the external face of the flattened tendon of insertion of the long vastus. Its removal does not involve the possibility of injuring the articular synovial sac. The tumor which is merely of white fibrous tissue, a lobulated fibroma, does not return after it has been taken off.

SUMMARY FROM RECENT PUBLICATIONS RECEIVED AND BIBLIOGRAPHIC ITEMS*

VETERINARY RECORD, December 2.—(O) Snoring in a cow. A specific ulceration of the genital organs in sheep.—Prolapsus recti in a cow.

December 9th.—Strychnia Poisoning in Dogs.—(O) Interdigital Melanotic Tumor.—(O) Intussusception of small colon in horse.

December 23d.—(O) A curious case in a fowl.—(X) Vaccination for epizootic bovine abortion.

VETERINARY NEWS, December 9th.—(O) Invagination of the small intestine in a bullock.—December 16th.—Interesting post mortem.—Therapeutic notes.—December 23d.—(O) Abdominal tuberculosis.—(O) Cystic disease of the air sinuses.

VETERINARY JOURNAL.—December (X) Value of the intradermo-palpebral method for the diagnosis of glanders.—Effect of heat, burns and scalds in the human subject and domestic animals.—(O) Cyst of the epiglottis.—A long illness.—(O) Neuroma of the 5th pair of cranial nerves.—Imperfect hymen.—Tuberculosis in a cart horse.—Cyanide of potassium poisoning.—(O) Vesicle calculi in a cat.

IL NUOVO ERCOLANI.—November 30th.—(O) Alterations of the suprarenal capsule in various pathological conditions in domestic animals.—December 15th.—(O) Cardiac vertigo in a mule.

RECUEIL DE MÉDÉCINE VÉTÉRINAIRE.—November 15th.—Treatment of Epizootic lymphangitis by iodide of potassium.—(X) Case of morvo-farcinous affection.

BULLETIN OF THE SOCIÉTÉ CENTRALE.—(X) Autopyotherapy in veterinary medicine.—(O) Cocaine in retention of urine.

ANNALES OF THE PASTEUR INSTITUTE.—November.—Contribution to the study of delayed or latent tuberculosis infection.—New researches upon the contagion of tuberculosis by expired air during cough.

A. LIAUTARD.

*Titles marked "X" will be summarized. Those marked "O" will appear as abstracts.

ANAPHYLAXIS IN CATTLE AND SHEEP, PRODUCED BY THE LARVAE OF *HYPODERMA BOVIS*, *H. LINEATUM* AND *OESTRUS OVIS**

SEYMOUR HADWEN, D.V.SC., AND E. A. BRUCE, V.S.

A preliminary note was published in the *Journal of the American Veterinary Medical Association* June 1916, on the first experiments conducted by one of us (S. H.) on anaphylaxis in cattle and sheep. These early results are included in this paper, with the later experiments which we have made together at Agassiz. We are publishing these results knowing that much remains to be done to clear up the exact nature of some of the reactions, the experiments, however, were started well on in the season for grubs and at the beginning of July had to be abandoned until next year, owing to lack of material.

The definition given by Muir and Richie (1910) of anaphylaxis is as follows:—"Anaphylaxis essentially consists in the development under certain circumstances in an animal of a hypersensitiveness to foreign albuminous materials which in themselves are not essentially toxic." "The common feature is that repeated injections of certain substances in sub-toxic or non-toxic doses,—a suitable interval of time elapsing between the injections,—may be followed by markedly toxic or even fatal symptoms."

The reactions we are describing while agreeing in the main with this definition, differ in as much that natural cases have been encountered where no injections had been given, the reaction being brought on by the rupture of Oestrid larvae within their hosts. Richet, (1910) for convenience divides anaphylaxis into acute and chronic forms. We quote the following:—"Chronic anaphylaxis, to indicate the accidents which follow a few hours after the unchaining injection." "Acute anaphylaxis is on the contrary that which is produced within the first hour." These two definitions describe the reactions we obtained in a very satisfactory manner, but the reaction coincides more closely with passive anaphylaxis, as the animal is in a receptive state when the first dose is given.

We would define the condition presented as a sensitiveness induced by warble larvae living in the tissues causing the host animal to become sensitive. When the larvae are removed from the

*Presented at the meeting of the A.V.M.A., Detroit, Mich., Aug. 21-25, 1916.

animal's own body (or from another's), and the protein material contained in the larvae is injected into the jugular of a sensitive animal, anaphylactic shock results. In natural cases we have proved that the rupturing of warble larvae in the animal's own back will produce the same result. Knowing the life-history of the larva, which penetrates the skin when it is less than a millimeter long, and from that time on lives within the tissues until it finally emerges from the back, enables us to say with some assurance that the larva having grown, nourished itself exclusively on animal tissues, must be composed of a substance resembling at any rate the tissues in which it has lived for a period of some ten months; though we must admit that these substances may have become modified within its own cuticle.

The material which causes sensitization would necessarily be caused by the larval excretions. That these larvae when crushed and prepared for injection contain little or no toxic material, is well established by the negative results obtained in animals of different species. Living within the connective tissues, *Hypoderma* larvae seem to occupy an unique position in parasitism as regards size. Their non-toxicity appears to be due, in part at least, to the food upon which they live,as in parasites of the intestines, such as the *Ascarides* and *Taeniae* toxic substances are found, which produce clinical manifestations of their presence.

The period of immunity and its duration following intra-jugular injections was not fully worked out, but four animals which received two or more injections, showed periods of immunity ranging from thirty days when a slight reaction was obtained, to an indefinite period. Three naturally immune animals which we encountered in our experiments prove that a long duration of immunity may occur.

Immune animals failed to react to the eye test. The interval between reactions in the eye tests was greater in animals which had received intrajugular injections; and in those which had not, the test could be repeated at very frequent intervals, the reactions obtained appearing to be nearly as severe each time the test was applied.

In sheep, the immunity judging from the few experiments we have made was the same as for cattle. One interesting result was obtained from the injection given to Lamb No. 1, proving that the

sensitiveness was inherited; in cattle we were not able to prove this point owing to lack of suitable material.

The amount of antisubstances present in the animals, presumably would be in proportion to the amount of sensitizing material contained in the excretions of the larvae, because anaphylaxis only occurs when the grubs have been broken in an animal or when a dose has been injected.

In the preliminary note already referred to, mention is made of a note by Ries (1916) on infectious pernicious anemia of horses, he quotes the Seyderhelms of Strasbourg who did some experiments with *Gastrophilus* larvae. They injected extracts of these larvae intravenously, the larvae having been collected from cases of anemia. In one case four larvae of *G. equi* were crushed and the filtrate added to 50 c.c. of salt solution, the mixture was injected slowly into the vein of a healthy horse which died in twelve minutes. Rabbits supported the same dose; dogs, mice, fowls, and pigeons were not incommoded by similar injections; pigs, sheep and cattle were equally indifferent.

Other horses were injected, one died in forty-eight hours after receiving the extract of three larvae. The larvae of *G. haemorroidalis* appeared to be more toxic than those of *G. equi* and a single larva caused death in twenty minutes. Other experiments were undertaken by these investigators, they proved that the imagos of these insects were also toxic, and they demonstrated to their own satisfaction that repeated small doses brought on anemia and finally death. Their conclusions are as follows:—"Anemia is not engendered by an ultravisible microbe but by *oestrine* a toxic substance produced within the bodies of *Gastrophilus*—larvae and insects—and especially those of the species *G. haemorroidalis.*"

Ries in commenting on these experiments says:—"I have myself insisted too much on the role of *Gastrophilus* —in toto—to contradict the statements of these authors: the anemia of Lorraine and the adjoining country, in the great majority of cases can not have any other origin, but it is not impossible that this is not the case in other regions." This in brief summarises the article to which reference has been made. The conclusions arrived at by the authors can scarcely be considered logical, and we believe that the theory of *Gastrophilus* being the transmitter of infectious anemia, can be upset, simply on the grounds that these flies are ubiquitous and infectious anemia is not. It was owing to this

article, however, that the experiments were undertaken to discover what effect the injection of *Hypodermq* larvae would have upon cattle.

There is no question that the repeated injections made by these investigators brought on some form of anemia, but judging from the results of American workers a single injection of blood from a true case of infectious pernicious anemia into a susceptible animal, is all sufficient to reproduce the disease in a given time. The sudden deaths after intravenous injection and the non-toxic effect of the same material in other animals would indicate that the results obtained were of anaphylactic shock and not of infectious anemia.

Method of preparing extracts used in experiments. The larvae were squeezed out of the warbles and were immediately washed in pure running water. They were handled in as cleanly a manner as possible and were cut into small pieces with sterile scissors, the juice was then squeezed out of them through a piece of cloth and sterile salt solution was poured over the skins to remove as much of the extract as was possible. The larvae were weighed before they were broken, and afterwards the skins, which enabled us to determine the exact dosage. The extract was injected as soon as possible after it was prepared, otherwise oxidation was found to occur and it would change color. A number of microscopic examinations were made of these extracts and for the most part it was difficult to find bacilli. This proves that the bodies of the larvae did not contain bacteria, at any rate in any numbers, and the few we did find were probably adherent to the cuticle and came from the pus in the warbles. The eye extracts were prepared in a different way; the larvae were washed as for injection and were simply punctured in several places, the clear fluid which exuded when the larvae contracted was collected and used in these tests without dilution.

PROTOCOLS OF THE EXPERIMENTAL INJECTION OF EXTRACTS OF HYPODERMA LARVAE. (Fatal cases).

Experiment with H. lineatum, April 16, 1916. Heifer No. 5. Eight larvae of *H. lineatum* were injected in 40 c.c. of salt solution into the jugular. Before the dose was fully injected the heifer's eyes and nose were changing color. The breathing then became fast and labored, the animal's tongue protruded, strings of saliva were seen and tears came from the eyes. The animal next defecated and dribbled urine. Clear mucus came from the rectum.

The anus strange to say in the short time the animal lived, was slightly swollen. The body turned a livid purplish color. After a few convulsive struggles to gain its breath the animal fell, it made a few more efforts to breathe, then died. All this occurred in less than five minutes. The heifer coughed a few times soon after the injection was made, and a distinct rattle of mucus was heard in the trachea.

Autopsy:—Just after death. All the white parts of the body were cyanosed. The urine was dribbling, the anus partly everted and mucus dropping. The mucous membranes were of a purplish color. Bloating was very rapid. The jugular veins stood out hard and tense. The blood was of a dark venous color. The posterior aorta was collapsed and empty showing that the right side of the heart was overburdened. The lungs were full of air and were congested, the trachea and bronchi were filled with bloody froth, and the mucous membranes were covered with petechiae. (Fig. 1). Congestion was general throughout the body, except in the case of the spleen and liver. The blood had completely lost its clotting property and remained fluid until putrefaction set in two days later.

Experiments with H. bovis, April 28. Cow No. 7. Injected the fluid contained in about three and a half larvae of *H. bovis* into the jugular. The dose which had been prepared was of the extract of five larvae, these weighed 5 grams, the skin weighed 1.8 grams, which equals 3.2 grams of extract, this was diluted in 30 c.c. of salt solution and 20 c.c. was injected in one syringeful. This dose had hardly been given when the animal showed symptoms of anaphylactic shock, the remainder of the dose was therefore withheld. She held her head back, began to salivate, tears came to the eyes. The cow was then let loose, stumbled out of the stable, went about fifty yards and dropped dead. The body twitched for a minute or two longer. Death must have taken place in about three minutes.

Autopsy:—Bloating began at once. The lesions encountered were similar to those of cow No. 5, the only additional lesions found were in the intestines, the mucous membranes being covered with petechiae. The anus became everted soon after death and bloody mucus dropped from it.

This cow's blood coagulated in 19 minutes prior to the injection. After death it had completely lost its clotting power.

Experiments with H. bovis, May 30. Cow No. 8.—Six larvae of *H. bovis* weighed 7.2 grams, the skins weighed 2.4 grams, which equals 4.8 grams in 20 c.c. of salt solution. Injected into the jugular, death occurred in 2¾ minutes. The first symptoms (as in other cases) were belching and shaking of the head, in one minute the eyes watered freely, salivation, breathing labored, dribbling of urine, coughing, and then blood stained saliva came. Facial respirations noted, the cow staggered and fell over dead. (Figs. 2-3-4). Blood taken before injection set in 27 minutes, but the sample taken immediately after death did not set and was still fluid three days later.

Autopsy:—Hemorrhages into the lungs, bright red clots were found in the trachea and a few venous clots in the lungs. The left side of the heart was empty, the right side was filled with non-coagulable blood, as also were the jugulars. The small intestines showed numerous red patches on the mucous membranes, the anus was everted and blood stained feces were passed.

Note:—The coagulation of blood in trachea and bronchi was probably due to the rapidity in which the hemorrhages occurred, i. e., before all oxygen was taken from the blood.

Notes on three fatal cases of anaphylaxis. One case resulted from the intra-jugular injection of the larval extract of *H. lineatum* and two from *H. bovis.*

The outstanding feature is the rapidity with which death occurred; symptoms of asphyxia were almost immediate. Hemorrhages occurred in all three cases, chiefly of the respiratory tract but also in the alimentary system. The bloody evacuations are somewhat suggestive of anthrax.

In all three cases the blood taken after death had completely lost its clotting properties. When freshly removed it was of a dark venous color, later red streaks would be seen on its surface, showing that some reabsorption of oxygen was taking place. In the hemorrhages which were found in the trachea the redness of the clots was no doubt due to the rapidity with which they were formed; or in other words, the vessels had ruptured and the blood had been coughed up into the trachea, before it had been fully acted upon by the influences at work which caused the remainder of the blood to become incoagulable. Presumably then the rupture of the vessels was caused primarily by excessive blood pressure.

PROTOCOLS OF THE EXPERIMENTAL INJECTION OF EXTRACTS OF HYPODERMA LARVAE. (Non-fatal cases).

Steer No. 1, March 31st. The extract of three larvae of *H. lineatum* in 50 c.c. of salt solution was injected into the jugular. In a few minutes the animal began to cough and to slobber at the mouth. Tears formed and the eyelids swelled. Feces were passed and the anus became edematous. Breathing was rapid, the animal looked thoroughly tired out. There was frequent urination. The injection was made at 3:30 P. M., and at 10 P. M. the animal looked normal again.

April 17th. A drop of warble extract was injected into the anus, with no appreciable result.

May 11th. Two larvae of *H. bovis* were squeezed out of this animal's back and an extract made from these was injected into the jugular. The larvae weighed 2.2 grams, the skins .6 gram, equals 1.6 of liquid injected. No result from the injection.

June 1st. A drop of warble extract was placed in the eye, with no results.

June 17th. A drop of extract obtained from warble-flies was injected into the eye with no result.

Bull No. 2. April 1st. The extract of four larvae of *H. bovis* in 50 c.c. of salt solution was injected into the jugular. The effect was apparent in five minutes. Cough, salivation, tears, gassy feces, and clear mucus passed from the anus. Edema of eyelids and anus, skin cyanotic, frequent defecation and urination, the urine came in drops. Temperature at 6:00 P. M., 102°, the animal still distressed and discharges apparent. The injection was made at 3:15 P. M.

April 17th. A drop of warble extract was instilled into the eye, with no result.

May 23rd. Four larvae of *H. bovis* were squeezed out of his own back, these weighed 2.7 grams, the skins .6 gram, which equals 2.1 grams of extract, which was diluted in 20 c.c. of salt solution and injected into the jugular. Symptoms developed instantly, salivation and then tears, defecation, dribbling of urine, the rectum turned a violet color and bloody evacuations with clear mucus were noted. The eyelids and anus swelled, the animal walked hesitatingly, the testicles were drawn up and the skin looked thicker than normal. The sheath swelled and wrinkled. The animal coughed. Two and a half hours after injection breathing was spasmodic and stertorous. Recovery.

June 7th. A few drops of extract were injected into the eye and anus. Three minutes after injection the animal was licking itself, and showed some irritation but the eye did not swell.

June 30th. A few drops were injected into the eye and the nostril at 11:42. He immediately sneezed, then urinated, licked his nose, tears came and at 11:48 was licking his body all over.

Steer No. 3. April 3d. The extract of four *H. lineatum* and four *H. bovis* larvae (some small) was injected into the jugular in 60 c.c. of salt solution. The injection took place at 3:15 P. M. and at 3:30 the steer got uneasy, began to smack his lips and to froth at the mouth. Cough, salivation, tears, the animal shook its head and became agitated. The eyelids swelled so that his eyes were barely visible. The body color turned purplish where the skin was white. Temperature before injection 101°, at 4:30 P. M. 99.6°. The anus (Fig. 5.) and eyelids swelled and the skin became shiny. The nostrils were swollen and the breathing became heavy, the animal snored. Eructations of gas heard. The steer was much better at 6:00 P. M. All the grubs of *H. lineatum* had left this animal, *bovis* had not yet appeared.

May 10th. Five larvae of *H. bovis* (four large and one small) were taken from the animal's back, crushed, filtered, and returned into the jugular with 20 c.c. of salt solution. The larvae weighed 4.1 grams, the skins .6 gram. The fluid injected was 3.5 grams. Injection at 10:33. At 10:53 the symptoms had become well marked. The effect of the injection was nearly as severe as it was from the first, except for the breathing which was easier. One additional sign noted was itching, the animal scratched one eye with its foot. This symptom may have been overlooked in the previous experiment. The animal recovered quicker from this dose, and at 3:00 P. M. very little remained of the edema.

Steer No. 4. April 12th. Eight larvae of *H. bovis* were broken under the skin on the animal's back. (This animal had only been exposed to the attacks of *H. bovis* during the preceding summer). The operation took 24 minutes, and it was not possible to tell exactly whether the larvae were properly crushed in all cases. Ten minutes after the last larva had been crushed, it was noticed that the steer was frothing a little at the mouth, and that his eye was dull, he also swallowed a great deal and his lips twitched. A little later when the animal was turned out of the stable he became very excited, and ran about the field. Tempera-

ture before the experiment 101.8°, two and a half hours later 101.7°. The symptoms though they were slight were definite.

April 13th. Ten warble larvae were broken on this animal's back, which took twenty minutes, with no appreciable results.

April 17th. A drop of warble extract was instilled into the eye with no result.

April 19th. The extract of three larvae of *H. lineatum* in 20 c.c. of salt solution was injected into the jugular, without effect.

April 22nd. The extract of four larvae of *H. bovis* in 20 c.c. of salt solution was injected into the jugular without effect.

May 10th. Four larvae of *H. bovis* weighed 4.8 grams, the skin 1 gram, equaling 3.8 grams of warble extract; this amount was injected into the jugular in 20 c.c. of salt solution. The results were negative.

June 7th. A drop of warble extract was instilled into the eye, in two minutes the animal was rubbing his eye and tears came, but there was no swelling of the eyelids.

June 9th. Five *H. bovis* weighed 5.1 grams, skin 1.5 grams equals 3.6 grams of extract, which was injected into the jugular, in 30 c.c. of salt solution. Slight symptoms were noted consisting of twitching of lips, cough, and slobbering. No eye symptoms.

Cow No. 6. April 27th. The extract of four larvae of *H. bovis* in 20 c.c. of salt solution was injected into the jugular. There were no definite signs of a reaction.

June 1st. A drop of warble extract was placed in the eye, with no result.

June 17th. A drop of extract from an *H. bovis* fly was instilled into the eye with no result.

June 30th. A drop of warble extract was placed in the eye, with no result.

Cow No. 9. June 14th. This animal was a tubercular suspect. Seven *H. bovis* larvae weighed 10.1 grams, skins 4.1 grams, equaling 6 grams of extract, this was injected into the jugular in salt solution to make 20 c.c. Injected at 10:47, slobbering started at 10:53, animal itchy and licking herself at 10:56. Belched, licked, and coughed at 11:02, at 11:04 the symptoms were more marked, she scratched both eyes with her hind feet. Yawned at 11:05, and coughed. The skin appeared edematous and wrinkled all over the body, (Fig. 6) markedly so around the eyes, (Fig. 7) neck and udder. Tears came at 11:07. Respirations very fast. At 11:10 the

vulva and anus were swollen and purplish in color; at 11:13 dribbling urine, respirations faster, slobbering increased, eyes swollen, 11:20 animal shot. Blood taken from the jugular immediately after death, beginning to coagulate at 11:43. Clots formed on the ground around the carcass. The wrinkling of the skin smoothed out after death. No larvae of *H. bovis* or any evidence of their presence was noted, but old lesions of *H. lineatum* were numerous. On post mortem all organs looked normal, except for a watery condition of the lymphatic glands, and a marked congestion of the respiratory tract.

Cow No. 10. June 17th. Eight larvae of *H. bovis* taken from cow's own back. Weighed 9.1 grams, the skins 2.7 grams, making 6.4 grams of extract in 20 c.c. of salt solution, were injected into the jugular at 12:08. The cow yawned at 12:09, then gasped, yawned again, dribbled urine, tears came, and eyes began to swell at 12:11. Dribbling urine and defecation at 12:13. Signs of great itchiness at 12:14. Udder getting wrinkled, and urinated at 12:15. Defecated again, slobbering, breathing labored, tears, and cough by 12:20. Clear mucus from the anus 12:22. Bloody feces 12:27. Vulva swollen. Respirations at 12:30 were 98. The animal kept walking backwards. At 1 P. M. she was lying down and the discharges were ceasing, other symptoms were not abated. At 4:00 P. M. she was apparently well. (Fig. 8).

June 28. A drop of warble extract was placed into the eye at 6:18, the cow scratched her eye at 6:20, eye watering and licking her self all over at 6:21.

June 30th. A drop of extract was placed into the eye, and two or three drops into the vagina at 12:03, cow scratched her eye at 12:04 and started licking her legs and body. The vagina became inflamed.

Cow No. 11. July 5th. Eleven *H. bovis* larvae weighed 15.5 grams, the skins 5.55, making 10 grams of extract, which was injected into the jugular in 40 c.c. of saline. No result from the injection. The animal started to eat grass as soon as released. The eye was also injected with absolutely no results.

Notes on eight non-fatal cases injected with Hypodermal extracts.

Six of these animals showed symptoms of anaphylaxis after injection.

Two animals, Nos. 6 and 11, proved to be immune both to intrajugular and eye tests.

The experiments on Steer No. 4 are interesting on account of the fact that this animal was only exposed to the attacks of *H. bovis* the preceding summer, and had become immunized to *H. bovis* extract by having had larvae crushed in his own back. To prove whether an animal was sensitive to one or both species of larvae, an injection of *H. lineatum* extract was made, without effect. Apparently then there is no difference between the composition of the fluid derived from *H. bovis* or *H. lineatum*. It is interesting to note that the immunity held by this animal was apparently breaking down, as after a space of twenty-eight days a slight eye reaction was obtained, and on the thirtieth day an intrajugular injection brought on slight systemic symptoms. With the exception of Steer No. 3 which became somewhat unthrifty after a second injection, none of the animals seemed to suffer any after effects. No elevation of temperature was recorded in any of the above cases, and although only a few temperatures were taken the animals were closely watched and none of the symptoms usually seen in fever were observed. The after effects of the injections as regards contamination were negligible, only one abscess developed which was on the neck of steer No. 4 and was possibly due to the introduction of skin bacteria.

PROTOCOLS OF NATURAL CASES OF HYPODERMAL ANAPHYLAXIS.

February 12th, 1916. Cow aged 7 yrs. Owned by the Experimental Farm at Agassiz, B. C. On being liberated after prolonged confinement she became very excited, ran about and broke through a wire fence, returning through the same opening she had made. The cow was then brought into the stable. The animal's back was badly scratched. The symptoms which appeared rapidly were as follows: running from the eyes, swelling of the eyelids. anus, and the vulva. The white parts of the skin were of a purplish color. Temperature normal.

Treatment. The animal received a dose of Epsom salts, and four hours later the cow had practically recovered and was feeding. The diagnosis made by one of us (S. H.) was of heart trouble.

Heifer 2 yrs. old. February 19th. This case occurred also at Agassiz, but was not seen by us. We are indebted to Mr. Moore, Superintendent of the Experimental Farm for the following notes: No history of injury, but the animals had been turned out after a

weeks confinement and had been taking violent exercise. The symptoms were first noted when the heifer was being stabled, and were as follows: running from the eyes, vaginal and anal swelling, udder and skin wrinkled, flatus and bloody feces. The animal strained a great deal and bellowed as if in pain. Temperature normal. The heifer remained down for two hours, breathed with her mouth open and her tongue hanging out. Evidently it was a very nearly fatal case. On the following day the animal appeared normal.

Report from Inspector J. D. Paxton of Kamloops, B. C. On May 13th, a cow presented the following symptoms: Swellings of eyes, anus and vulva, also wrinkling of the skin in different parts of the body. Breathing was labored. Recovery was rapid.

Dr. Paxton also recalled a case he had seen in a cow which was rapidly fatal following a somewhat severe beating over the back.

Dr. F. W. Ottewell of Ladners, B. C., reported two cases in cows. The cases occurred in the spring; he noted swellings especially around the anus and udder. Both animals had difficulty in breathing and their eyes were swollen.

Dr. J. W. Darby of Mission, B. C., on being shown photographs of affected animals, said he had encountered such cases while practicing in New York State.

Notes on cases occurring in nature. The foregoing natural cases require but little comment, except to emphasize the fact that the disease occurs under natural conditions, and perhaps more frequently than we are aware. The fatal cases which may occur would scarcely be diagnosed before death, in view of its extreme rapidity. This may explain the nature of some of the deaths occurring in the spring of the year, often attributed to anthrax and in which no bacilli are demonstrable.

PROTOCOLS OF THE EXPERIMENTAL INJECTION OF AN EXTRACT OF OESTRUS OVIS LARVAE.

Sheep No. 1. April 18, 1916. Four larvae of *Oestrus ovis* weighed 1.2 grams, the skins weighed .25 gram. ea, the extract from these was placed in 20 c.c. of salt solution and injected into the jugular. The injection was made at 3:31 P. M., the sheep died at 3:46 P. M. The dose was not fully injected when the animal gave a deep sigh, by the time it was fully in the sheep was frothing at the mouth. The nostrils were turned up and wrinkled. The sheep got up and defecated, it stood still and put its nose out straight and breathed hard, frothy mucus dribbled from the mouth.

The skin and mucous membranes assumed a purplish color. It then staggered about and fell, got up again, violent tremblings occurred and the breathing became more labored, the tongue was protruded. After making a few more attempts to get its breath it fell over dead.

Autopsy:—The lungs and all the adjacent glands were engorged with dark venous blood. The mucous membranes of the trachea and bronchi were much congested. The posterior aorta was empty. The blood was incoagulable. Prior to the injection a sample of blood taken set in 7.5 minutes. Four larvae of *Oestrus ovis* were found in the head.

Sheep No. 2. April 29. The extract of two larvae of *Oestrus ovis* weighed .4 gram. The larvae weighed .5 gram, and the skins .1 gram. The extract was injected into the jugular in 20 c.c. saline solution. Symptoms of anaphylaxis were noticed at once, the animal frothed at the mouth and tears were seen. The sheep staggered about and threw itself down, its skin became cyanotic and there was great difficulty in breathing. (Fig. 9). Respirations 70 to the minute. Later the discharge from the nostrils became very heavy and strings hung from its mouth. (Fig. 10). The sheep gave a grunt about every twelfth breath and swallowed a great deal. There was a rattling sound of mucus in the trachea. The injection was made at 11:09 A. M. and at 1 P. M. the sheep was easier, though it still looked very ill. At 6 P. M. the animal was much better and walked fairly well; she even tried to run. The skin was still somewhat cyanosed and the respirations 30 to the minute. The blood taken before injections set in 8 minutes; the incision which had been made in obtaining it, started to bleed afresh after the injection had been made.

Sheep No. 3. May 1. Oestrus ovis larva weighed .2 gram., the skin weighed .15 gram. and the extract .175 gram. The extract in 5 c.c. of salt solution was injected into the jugular. The sheep frothed at the mouth immediately the dose was in, and died in less than 15 minutes. Blood taken prior to the injection set in under 15 minutes. After injection the blood was incoagulable, and remained fluid until putrefaction set in.

Autopsy:—The lungs and adjacent glands as in the previous case were engorged with blood, and numerous petechiae were seen in the lungs. No *Oestrus ovis* were found in this sheep.

Lamb No. 1 May 9. The extract of one *Oestrus* larva was injected into the jugular, in 5 c.c. salt solution. The larva weighed .2 gram. The injection was made at 10:30 A. M. Symptoms were immediate, the lamb defecated, it then began to salivate, its skin turned a purplish color and the breathing was labored, the animal opened its mouth. In about 15 minutes the breathing became almost suspended, the abdominal muscles were called into play. At 1 P. M. the lamb had almost recovered and drank milk. The blood taken before injection set in 5 minutes, 20 minutes afterwards another sample was taken which took 23 minutes to set, when drawn it was of a venous color but gradually it became redder and looked like normal blood when it had set. (Fig. 11).

June 5th. The fluid extract of one *Oestrus ovis* larva was dropped into the eye with no results.

Lamb No. 2. June 5th. The fluid extract of one *Oestrus ovis* larva was dropped into the eye with no results.

June 7th. Two *Oestrus ovis larvae* weighed .55 grams, the skins .25, giving .3 gram. of extract, which was injected into the jugular in 5 c.c. of saline with absolutely no result.

Notes on sheep experiments. The symptoms in sheep are almost identical with those in cattle, but a difference will be noted, i. e., the swelling of the eyes and the anus were wanting. It will be noticed that the eye tests were unsuccessful, but the animals experimented upon were immune, one having received a jugular injection previously, the other being naturally immune.

OPHTHALMIC AND OTHER LOCAL REACTIONS WITH FLUID FROM WARBLE LARVAE.

Steer No. 12. May 30th. A drop of warble extract was placed in the eye. The animal immediately scratched the eye with the foot, and rubbed it. There was salivation and running from the nostrils. He licked himself especially over the areas of hypodermal rash. Coughing and yawning was also noted. (Fig. 14).

June 3rd. Injected a small drop of extract into the anus, following which there was pruritis and a little swelling, lasting about three hours.

June 6th. Injected a few drops of extract into the anus at 4:40. Five minutes later the steer was licking himself, and the anus was very irritable. About an hour later the anus was examined and found swollen.

June 17th. A drop of extract from an *H. bovis* fly was placed

in the eye, irritation was shown, the animal was scratching his eye in one minute and the membrana nictitans was passed over it.

June 30th. A drop of warble extract was instilled into the eye at 11:30, tears came in one minute, at 11:34 the anus was injected, owing to the animal's movements a little spray went upon the anal orifice, in a short time small round swellings were seen. There was great irritation, the rash was nearly gone at 12:13.

Cow No. 13. May 30th. A drop of warble extract was placed into the eye. Symptoms noted were, tears, swelling of conjunctiva, irritation, scratched eye with foot, licked herself, salivated, and ran from the nostrils. The symptoms disappeared inside of two hours.

June 30th. A drop of extract was placed into the eye at 11:37, tears came at 11:39, a drop was placed upon the vulva at 11:35, tail switching, and irritation at 11:36. Vagina inflamed at 11:44 and the tail was held in tightly.

Cow No. 14. June 1st. A drop of warble extract was instilled into the eye, tears flowed at once and there was great irritation, the animal licked herself all over especially on the areas of hypodermal rash. Membrana nictitans passed frequently over the eye and a severe conjunctivitis developed, which lasted for several hours, mucus ran from the nostrils. (Fig. 12).

June 3rd. Placed a drop in the opposite eye, the reaction began in one and a half minutes, tears and nasal discharge as before, the reaction lasted over six hours.

June 17th. A drop of extract was placed in the eye, at 8:35 swelling noticed at 8:40, conjunctivitis and licking of body at 8:45.

June 30th. A drop was placed into the eye and nostril at 11:38, at 11:40 there was blowing through the nose, persistent licking of the nostrils, and slobbering. The eye symptoms were not as severe as in the preceding tests.

July 7th. Injected a drop of extract into the eye, at 5:40, tears in one minute. At 6:05 the eye was watery and the conjunctiva swollen, the eye partly closed, and the membrana nictitans prominent.

Heifer No. 15. June 1st. Two drops of warble extract were placed on the lips of the vulva. The animal began at once to switch her tail and to lick herself all over. The mucous membranes of the vulva which previously were pale, became a fiery red. The irritation lasted for about three hours.

June 7th. A few drops were put into the eye and vagina. In one minute she was scratching the eye with her foot, and licking herself all over, irritation of vulva evinced by tail movements. The reaction was severe, slobbering and tears occurred and the animal did not return to the normal for several hours.

June 17th. A drop of extract from an *H. bovis* fly was injected into the eye. The heifer scratched her eye in one minute.

June 30. A drop of warble extract was put into the eye at 11:30. (Fig. 13). Tears, conjunctivitis, and bodily irritation followed almost immediately. A drop was also placed into the vagina at 11:33 and inflammation was well marked at 11:45.

Heifer No. 16. June 3d. A drop of warble extract was placed in the eye with no effect.

June 30th. A drop was placed into the eye, the animal scratched the eye in two minutes, the reaction, however, was slight, no other symptoms being noted, possibly the scratching was due to some other cause.

Control tests on other animals with warble extracts. Two horses were injected in the eye without results. Four pigs were injected similarly without results. Two lambs received eye injections without effect. Eight rabbits were also negative to the eye test.

OPHTHALMIC REACTIONS WITH FLUID FROM *Gastrophilus equi* LARVAE.

Horse. July 17th. An extract of *G. equi* was prepared from two larvae, the clear fluid which exuded after puncturing was employed. One drop was instilled into the eye at 10:11 A. M., followed immediately by shaking of the head and blinking. The membrana nictitans was repeatedly passed over the eye. Tears in one minute. Rubbing eye on leg at 10:14. Eye closing, activity of membrana nictitans, swelling, rubbing again, tears becoming mucilaginous. At 10:30 the eye was nearly closed. At 3:15 P. M. eye still swollen contains sticky mucus. At 6:45 P. M. the eye still partly closed, but the swelling going down fast. (Fig. 15).

Control tests. Two cattle, Cow No. 13 and Steer No. 12 were used as controls; both these animals were highly sensitive to warble extract, but two full drops of *G. equi* had absolutely no effect upon them.

July 19th. The experiment of July 17th was repeated on the same horse, the opposite eye being injected. The results were identical. A few drops were sprayed upon the anus, resulting in

irritation and swelling. Cow No. 10 was used as control with negative results.

Notes on the ophthalmic experiments. It will be observed that the eye reaction did not occur in animals which were immune to intrajugular injections. The control tests were made on a variety of animals, including horses. The reactions obtained in a horse with *G. equi,* strengthens the control tests and demonstrates the specificity of the reaction.

EXPERIMENTAL INJECTION OF WARBLE EXTRACTS INTO RABBITS.

Two rabbits, Nos. 1 and 2. April 17th. The fluid extract of eight larvae of *H. lineatum* amounting to about 4 c.c. was diluted to make 20 c.c. in salt solution, 10 c.c. was injected into the peritoneum of two rabbits. There were no after effects.

April 27th. The rabbits were reinjected with about the same dose. One rabbit showed signs of severe shock, the other to a lesser extent.

Two rabbits, Nos. 3 and 4. May 30th. 3.5 grams. of *H. bovis* extract in 10 c.c. of salt solution was injected intraperitoneally into each rabbit. No toxic effects were noted.

June 28th. Rabbit No. 3 received an intraperitoneal injection of 4.10 grams of *H. bovis* extract in 10 c.c. of salt solution, at 5:38. The eyes were watering at 5:46, breathing fast at 6:02. Lying in a corner and appeared ill at 6:06 the genitals dark colored and swollen. Recovered.

June 30th. Rabbit No. 4 received an intraperitoneal injection of 7.70 grams. of *H. bovis* extract in 20 c.c. of salt solution at 2:57, in one minute there was sniffling, licking himself all over, biting tail and body, appeared very itchy. At 3:05 he was lying down stretched out and quiet. Recovered slowly.

Eye test on rabbits 3 and 4. June 17th. A drop of *H. bovis* extract was injected into the eye of each rabbit. No. 3 showed slight effects such as blinking and a peculiar turning up of the eye-ball. No. 4 showed the membrana nictitans and the eye was watering ten minutes after injection, the eye-ball also turned up.

Control rabbit. Showed no effects from injection.

EXPERIMENTAL INJECTION OF WARBLE EXTRACTS INTO GUINEA-PIGS.

Guinea-pigs, Nos. 1 and 2. April 17th. 2.5 c.c. of warble extract from 5 *H. lineatum larvae* in 30 c.c. of saline solution. The amount was divided into two and injected intraperitoneally. There were no toxic effects.

April 27th. Injected 1 c.c. of *H. lineatum* in salt solution into each guinea-pig. No. 1 became ill and shivered. No. 2 showed no effects.

Guinea-pigs, Nos. 3–4–5–6. May 30th. Each Guinea-pig received 5 c.c. intraperitoneally of a solution of 6.4 grams, of *H. bovis* extract in 20 c.c. of salt solution. No immediate effects from the injection.

June 2nd. Guinea-pigs 3 and 4 died of septicemia.

June 28th. Guinea-pig No. 5 received 2 grams. of *H. bovis* extract in 5 c.c. salt solution, intraperitoneally, at 5:41. Cough and twitching of the mouth at 5:46, front feet itchy and biting same, scratched eye, eyes partly closed and very itchy, at 5:47. Animal looks ill 5:55. White parts of the skin cyanosed at 6:10. Died between 8 and 10 A. M. next morning.

Guinea-pig No. 6 received the same dose as No. 5. Injection at 5:42. Cough and mouth movements at 5:46, front feet and body itching, stretched out on belly, 5:54. At 5:57 scratching all over, 6:15 lying down, eyes watery. Died at 2:45 P. M. next day.

Guinea-pigs, Nos. 7 and 8. June 1st. Received 2 grams. each of *H. bovis* extract in 5 c.c. of salt solution, intraperitoneally. No immediate effect.

June 30th. Guinea-pig No. 7 received 3.65 grams. of *H. bovis* extract in 5 c.c. saline solution intraperitoneally at 3:02 P. M. At 3:15 animal very quiet, died at 7 A. M. next morning.

Guinea-pig No. 8 received the same dose as No. 7 at 3 P. M. At 3:10 was very uneasy and scratching, at 3:12 lying quiet. At 3:18 was scratching and biting himself all over. Found dead at 7 next morning.

EXPERIMENTAL INJECTION OF OESTRUS OVIS EXTRACTS.

Guinea-pigs, Nos. 9 and 10. April 19th. The fluid extract of four *Oestrus ovis* larvae in salt solution was divided into two doses, and injected intraperitoneally. There were no immediate results.

April 29th. 1.3 grams of extract in salt solution was divided into two doses and injected intraperitoneally at 10:45 A. M. Both guinea-pigs became ill, and at 6 P. M. were very weak. They were both found dead next morning.

Notes on Rabbit and Guinea-pig experiments. The reason for the preliminary doses being so large was to prove that the extract used was non-toxic, and also that it did not contain an excess of

contaminating bacteria. No animal died of acute anaphylactic shock. Six out of eight guinea-pigs died the day following the second injection. Two other guinea-pigs died of sepsis, but in this case the larvae used for the injections were dead and properly speaking should not have been used for that purpose.

Summary

Anaphylaxis has been reproduced in cattle, sheep and small animals, with extracts of the larval forms of *H. lineatum*, *H. bovis*, and *Oestrus ovis*.

The "acute and chronic" forms have been reproduced, coinciding with Richet's definition.

The reactions can be induced by crushing and returning an extract of an animal's own larvae into the jugular, showing that larvae living in the animals make them receptive.

Natural cases of anaphylaxis are described where no injection had been given, and where injury had ruptured the larvae subcutaneously, liberating their contents in sufficient quantity to produce shock.

A paper by Ries is reviewed in which the author ascribed the cause of infectious anemia as being due to *Gastrophilus sp*: it seems probable that he was dealing with reactions such as we describe.

Animals which had recovered from the reaction were found to be immune for varying periods.

The symptoms in "acute" anaphylaxis were immediate; the first noticeable sign being an extremely tired look, succeeded almost immediately by salivation, tears and defecation, then by signs of asphyxia, and death. In the "chronic" form the symptoms were a little less rapid and not so severe, in addition there were edemas especially of the eyelids and anus, and marked irritation of the skin.

Small animals were sensitized with warble extracts and showed signs of anaphylaxis following the second injection.

Eye and other local reactions were obtained with extracts applied to the mucus membranes. In cattle the reaction was specific for extracts of *Hypoderma*, and in a horse for *Gastrophilus*.

It would appear probable that similar reactions will be obtained in other animals with their own parasites.

Note: We are indebted to Dr. F. Torrance, Veterinary Director General, Canada for permission to publish this paper.

REFERENCES

HADWEN, S. 1915. A further contribution on the Biology of *Hypoderma lineatum*. *Bulletin No. 21 Dom. Dept. of Agr. Canada*, pp. 1-10, Plates 5, and BRUCE, E. A. 1915. Observations on the Migration of Warble Larvae through the Tissues. *Bulletin No. 22 Dom. Dept. of Agr. Canada*, pp. 1-14, Plates 2.

1916. Hypodermal Anaphylaxis. *Jour. Am. Vet. Med Assn.*, Vol. 2, No. 3, Figs. 2.

RICHET, C. 1910. Nouvelles Expériences sur la Crépitine et l'Actino-congestine. (Anaphylaxie et Immunité) *Ann. Inst. Pasteur*, No. 8, pp. 609-652.

RIES, J. N. 1916. Sur la pathogenie et le traitment de l'anémie pernicieuse et infectieuse du cheval. *Receuil de Médecine Vétérinaire* Tome. XCII, Nos. 1 et 2.

Fig. 1. Trachea of Heifer No. 5, showing petechiae

Fig. 2. Cow No. 8, just after the injection had been given. Note strings of bloody mucus.

Fig. 3. Cow No. 8 in act of falling.

Fig. 4. Cow No. 8 breathing her last. Note blood in mouth.

Fig. 5. Steer No. 3. Œdema of anus.

Fig. 6. Cow. No. 9. Note wrinkling of skin.

Fig. 7. Cow No. 9. Note wrinkling.

Fig. 8. Cow No. 10.

Fig. 9. Sheep No. 2. Anaphylactic shock.

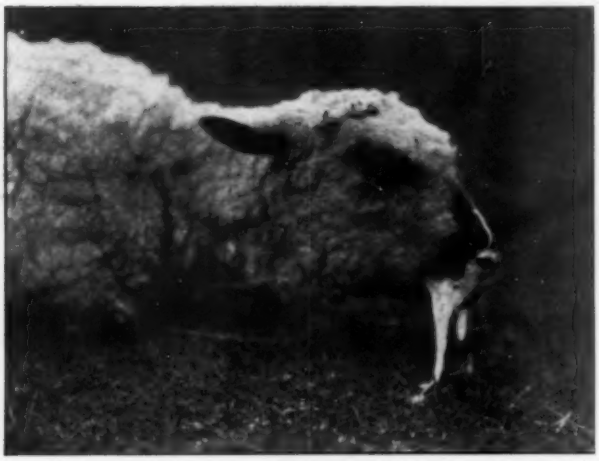


Fig. 10. Sheep No. 2. Note heavy discharge which appeared later in the reaction.

Fig. 11. Lamb No. 1.

Fig. 12. Cow No. 14. Note swelling of conjunctiva.

Fig. 13. Heifer No. 15. Eye reaction.

Fig. 14. Steer No. 12. Eye reaction.

Fig. 15. Horse. Eye reaction with *G. equi* extract.

DISCUSSION

DR. REICHEL: I would like to ask Dr. Hadwen just what he meant by referring to some animals as immune. I could not quite get the connection of the expression of reaction in regard to immunity which he made several times.

DR. HADWEN: After an animal has been injected one finds a degree of immunity to a reinjection. Sometimes it appears to be quite fixed, so to speak. We found three naturally immune animals in the course of our experiments; the injections had absolutely no effect upon them at all. In the case of animals that had been injected, we found reinjections, if they were made after a short interval of time, had no effect whatsoever, at least no apparent effect. We had one slight reaction after about a month; with others after a longer period. We cannot give the minimum or maximum time required.

DR. GILTNER: I take it this is a diagnostic test; but I would like to ask if you were able to prepare an agent that you could instil into the eye, and keep it for long periods of time; also if there is any therapeutic property in your injections.

DR. HADWEN: As for the therapeutic property, I do not know anything about that at all; I cannot tell yet. We have not done enough work. As for diagnosis I think it is absolutely all right. I am not at liberty to tell you exactly what happened, but I had a talk with Dr. Ransom in Washington the other day. He has been doing some work which will be published. Dr. Eichhorn I think may be able to throw a little light on it because he also told me that one of his men had done some work recently, since reading my first little note which was published in our proceedings.

DR. GILTNER: Could you transport the diagnostic material and keep it for long periods of time?

DR. HADWEN: I have not tried. I have always used living larvae, but if the larvae are allowed to die, they soon go wrong, and one does not know what he is doing if he uses them.

DR. J. W. CONNAWAY: It would seem that the diagnostic value of this might be called into question so far as the grub was concerned; the sheep and the lamb showed some reaction, possibly from heredity. It would be a matter of how long that lamb would retain that property of reacting from this injection. I think possibly even in that small lamb, along at this season of the year, it may have been quite badly infested with grubs in the head. I recently made some observations along that line, and I was surprised how soon a little lamb would become infested with these grubs, which attain a very large size. I think there is a possibility and in the case where this reaction is shown that there may have been an actual infestation. You did not make a post-mortem of any of those lambs?

DR. HADWEN: No. I do not think there is any doubt, though, that the lamb was not infested, because it was far too early in the season for any flies to be about; if I remember correctly, we hadn't even seen any *Tabanidae* at that time and the *Tabanidae* come along before *Oestrus ovis*.

DR. CONNAWAY: Where was your material taken from?

DR. HADWEN: It was obtained from the heads of sheep which had been slaughtered.

DR. CONNAWAY: From older sheep?

DR. HADWEN: Yes.

DR. MCGILLIVRAY: I would like to ask Dr. Hadwen to say what the effect of crushing the grub was while on the animal's back.

DR. HADWEN: I can tell you something about that. I spoke about natural cases. The first case was of a pure bred cow which had been confined owing to bad weather for some time. She was let out. As a cow does after being confined, she ran about a great deal, and finally she went through a wire fence, and came back through the same opening, injuring her back. In a little while I

was called to see this cow, and I threw up my hands and said I had never seen such a case before. Her eyes were swollen; she was panting; the vulva and the anus were swollen; and she was purple where the skin was white. I said I didn't know what it was at all. I said there must be something wrong with her heart; she had been running too hard, she had strained it; that was all I could tell, and I was partly right. At that time I had not tried these experiments.

There was a second case which occurred on the farm I lived on, of exactly the same nature. The cow had been turned out, as in the preceding case, and had taken violent exercise; proving I think, without a doubt, that if an animal's back is injured and the larvae are ruptured, that shock will result.

DR. REICHEL: Do you find a large number of the older animals, non-sensitive to the first injection; or do you find any of them non-sensitive?

DR. HADWEN: That is a question I cannot answer, because we have not done enough experiments. We killed three old cows, and we got reactions in eight others, and in three we did not get any. One was about two years old; that was the youngest.

DR. GOSS: Have you ever injected small doses in succession to determine whether the symptoms are long, and also how long salivation persists after the injection in those cows that have reacted?

DR. I. E. NEWSOM: I would like to ask if heat has any effect upon the agents that he has used?

DR. DAY: I would like to ask a question in connection with the injury of the grub. In connection with this cow that ran and was injured, were the tissues around about the injury crushed, or was just the grub crushed? We find oftentimes in packing houses where there has been some pus formed around the grubs and the grubs seem to be dead. I am wondering now if there was a case of anaphylaxis possibly at the time they were injured, or providing the tissues had been torn about the grub, whether it would be absorbed if the tissue itself was not injured and was not allowed to percolate through the broken down tissues.

DR. CONNAWAY: Did you make any bacteriological studies of this nature? Might this not be due to some toxin development in the little sacs surrounding these grubs, say in the sheep or in the case of an ox? Isn't there a possibility that there may be a bacteriological reaction there?

DR. HADWEN: Regarding the repeated small injections, I have not done that; but in the eye tests we found that we could repeat them very frequently and could do it every day if we liked with successful results. Of course, if the injections were large enough and injected into the body, then we would get a degree of

immunity. It depends very largely upon the rapidity with which these injections are made. In Richet's original experiments on anaphylaxis, he found if he took over ten minutes to inject a dose that shock would not occur, and that he could inject a dose which would otherwise be mortal; I mean that the dose was large enough to kill the animal several times over if it had been given quickly.

Heat I have not tried at all because I was afraid of heat. Of course, a lot of these things are destroyed by heat; so we did not use it in any of the experiments. I notice in the review that Ries gives, that they did use heat.

About the grubs being crushed and the larvae being found dead under the skin and the absorption; I have done a certain amount of work on this and observed it; but this is something that I don't quite understand myself. The absorption of the dead grubs is very slow apparently. I did one experiment this spring in breaking the larvae on a calf's back which only gave us the results that you see described in this paper; but we were too slow, much too slow, we took twenty minutes to break eight larvae, and presumably the absorption was not rapid enough to produce severe shock. Those grubs are lying under the skin and they will stay there, perhaps a year longer. I have found that the bodies of the grubs do not absorb very rapidly; I have taken them out myself months after they had died, and you will find the skin of the crushed body of the larvae. The larvae may be broken accidently as in transit, as the doctor suggests.

As for the pus in the warbles, I don't know of any work which has been done on it. Of course the pus organisms gain entrance from the outside, and it depends altogether, I presume on the character, the species, and the susceptibility of the animal to them. As to the effect of the introduction of the pus into the general circulation, this would depend on what bacteria and toxins it contained. In our experiments, though, all danger of that was, I think, fairly well removed, because we washed the larvae carefully in the purest running water which we obtained from a mountain stream, and that is, of course, all we could do; but we took very great care in doing this, and after they were washed, an extract was made, and then I examined smears for bacteria. The material used for injection was practically sterile; we only found an occasional germ, and the injections also did not cause any trouble in small animals, proving beyond a doubt, that bacteria played no part in these reactions at all. In the cattle during the whole course of the experiments we only produced one abscess.

NYMPHOMANIA OF MARES*

H. FULSTOW, Norwalk, Ohio.

I have been requested to make a report of nymphomania in mares, and to make a special effort to describe the kind of subjects that recover, and the kind that are not benefited by ovariectomy.

I do not know that I can enlighten you a great deal upon this subject further than what I reported in Toronto, in 1911. I have operated upon a great many more mares since that time, and the results in the main have been about the same.

Nymphomania or excessive sexual desire on the part of the mare, is of somewhat common occurrence, and when it does occur, is a very dangerous and disagreeable habit. Mares affected with this troublesome affliction are a source of great annoyance to their owners and, in fact, to anyone who has the care or management of them.

ETIOLOGY. A good many theories have been advanced as to the causative factor by different authors. Yet nothing very definite has been proven.

Nymphomania is often caused by diseased conditions of the generative organs, particularly inflammations, cystoid degeneration, hypertrophy of the ovaries, diseases of the uterus and vagina, occlusion of the os uteri, new growths, atrophy and hypertrophy of the womb are also mentioned.

This does not constitute an independent disease, but, is only a symptom arising from various causes. Tumors and cysts are quite common, affecting one or both ovaries, and, no doubt there are other conditions as well.

I remember some time ago, removing a cystic ovary from a three year old filly, that weighed 7¾ ounces, the other ovary weighed 1½ ounces. In a great many cases that I have operated upon I have found one or both ovaries diseased. In a few cases I have been unable to find any pathological changes whatever, either in the ovaries, or in any part of the generative organs.

Diseased ovaries do not always produce nymphomania. I have posted several mares, with diseased ovaries, that were kind and gentle in every way.

Neither does every mare that kicks have a pathological condition of the generative organs. Many cases have improved in

*Presented at the meeting of the A.V.M.A., Detroit, Mich., Aug. 21-25, 1916.

habit by being operated upon, that showed no pathological condition.

Heredity is an important factor which must not be altogether overlooked. Some animals are born with a bad disposition, inherited from the sire or dam, or perhaps both. I have known of certain families producing very vicious foals, both male and female. I spayed four fillies from one dam that were vicious and she herself was the same. They could do nothing with her but breed. Three of these were completely cured by ovariectomy. From the fourth, I afterwards removed the clitoris, and she also made a serviceable animal.

Might it not be possible in some instances for the stallion to assist in disseminating the disease, while suffering or convalescing from some contagious or infectious disease, such as influenza or strangles, or, after covering some dirty, filthy mare, through carrying the disease germs to a healthy vagina and from there be disseminated to the other parts of the generative organs?

In conclusion, I might say that, as far as the exact cause is known, and from my own personal observation, nymphomania is due to some irritation of the generative system, together with, in many instances, a mean or bad disposition.

Symptoms.—These are easily recognized. The animals are irritable and ticklish, every touch seems to annoy them. They will kick, squeal, and strike upon the least provocation. They appear restless, neigh often, and show a great desire to urinate, straining a good bit in doing so, emitting only a small quantity of urine mixed with mucus and a dirty yellowish substance. If excited, they switch the tail at the same time and sometimes kick.

Others do not kick at all, but appear in heat most of the time, leaning up against you when you go into the stall to feed or harness them. In some subjects these symptoms are constant, while in others, they only appear during estrum. Neither age, breed, nor condition seem to have anything to do with it.

Some breed fairly well for a few years and others are practically worthless even for this purpose. In some of the milder forms of this disease they are fairly useful, but, as time goes on, they gradually grow worse, losing flesh from the irritation set up by the diseased condition and from the continual straining and, last but not least, from the abuse they receive at the hands of their owners.

MODUS OPERANDI.—No doubt many of you are as familiar with the modus operandi as I am myself, but for the benefit of those who have never performed the operation, I will just outline it in a general way.

First.—Get as good a history of your patient as possible. Try to find out how long she has been mean and when she kicks—if only during estrum, or any time.

See that she is in good healthy condition, not suffering from any kind of fever, nor pregnant. If she has been kept up and grain fed, it is a good plan to give a laxative and a few bran mashes. If she has been running at pasture, she will need only starving for 24 to 36 hours. If the bowels are empty the operation is more easily performed with less danger to the animal.

An hour or so before operating, it is a good plan to give an ounce or two of chloral hydrate, according to the size of the mare, or you may give an intravenous injection of cannabis indica.

The subject should be secured in a good set of stocks, if no stocks are available, other means must be devised, such as slings, hippo-lasso, hobbles, etc., or in the recumbent position under general anesthesia.

After your animal is in the stocks with her head pulled up, with ropes or straps over the back and under the belly, to keep her from kicking and lying down, have your assistant carefully empty the rectum of all fecal matter and with warm water and soap wash off the tail and external parts. Then, wash with a 1–1000 bichloride of mercury solution, being especially careful to remove all sebum from around the clitoris and just inside the lips of the vulva. Do not wash out the vagina unless it is dirty, and then with only the mildest form of antiseptic. Strong antiseptics irritate the mucous membrane and cause straining, besides it would leave a good field for infection.

Place a bandage on her tail and tie it, or have your assistant hold it out of your way.

Having previously sterilized your instruments, and your hands and arms as far as possible, balloon the vagina by means of a fountain-syringe or clean piece of rubber-hose and funnel, with sterile water to which has been added a little soda bicarbonate.

With the knife concealed in the palm of the right hand, pass into the vagina and unsheath it. If the vagina is well ballooned, place the knife just a little above the os uteri and slightly to the

right or left and push it through the wall in a straight line, by a sudden forward movement, piercing all of the coats at one stroke. This is the most critical part of the operation.

Sheath the knife and drop it on the floor of the vagina. Then insert your finger to see if you have pierced the serous coat. If not, you will have to balloon the vagina again, because it will have collapsed and there will be danger of wounding one of the iliacs. It would be very humiliating to have her bleed to death before your eyes as one did for the writer. After it is again ballooned, pierce the serous coat with your knife, or, perhaps you might be able to pierce it with your finger without ballooning, but there is danger of tearing the serous from the muscular coat, leaving a pocket from which you might get an abscess.

When the incision has been completed, sheath the knife and drop it on the floor of the vagina, introduce one finger, then two, then with fingers in the shape of a cone, introduce the whole hand carefully rotating the hand while so doing. Immediately you are through the opening drop the palm of your hand upon the body of the uterus following it to its bifurcation thence each horn to the ovary. Examine each ovary as to size and condition.

Next, remove your hand, at the same time bringing out your knife, which you had previously dropped on the floor of the vagina. Rinse off hand and arm, and with fingers through your ecraseur chain pass it into the abdominal cavity, dropping it over the left ovary, pull the ovary into the loop of your ecraseur chain so as to get as much of the Fallopian tube and broad ligament as possible. The operator steadies the ecraseur with his left hand while his assistant tightens up the chain. The operator must make sure by feeling that no portion of the bowel is included in the ecraseur. Then, have your assistant work the ecraseur, crush off the ovary rather quickly. The animal will struggle some at this time. Hold the ovary until it is outside the body.

With the left hand remove the other ovary in the same manner.

Rinse off the external parts and remove from stocks. The wound made is left to nature. I have never known prolapse of the bowels to take place.

After-Care.—Tie up by the head so she cannot lie down for the first twenty-four hours, then turn loose in a good, clean box-stall or paddock if the weather is fine. Feed laxative feed, such as bran mash and grass (if in season). After a week or ten days,

if no complications arise, she may go home and be put to work, and kept at it for some time, to have a chance to forget her habits.

This report extends over a period of sixteen years and covers something over two hundred cases. In looking over my notes I find that at the Toronto meeting I divided them into three classes. First—Mares that are mean when in heat only, and those that are in heat continually, but do not kick. All will be cured by ovariectomy.

Second—Mares that kick nearly all of the time, whether in estrum or not. Some will be cured by ovariectomy, others will be benefited, and, in a few instances, the operation will do no good.

Third—Old mares that have kicked for years, and the habit has become confirmed, and those that kick all of the time when not in heat, but are gentle when in heat. These as a rule will not be at all benefited by the operation.

The results of the operation upon the first class are generally immediate.

In the second class, results may be immediate in a few instances in young animals, but, the majority go all the way from a few weeks to several months. One of this class, which I will report, went nearly two years.

As to the third class, I generally tell the owner that I think it useless to operate upon them.

Case Reports.—I will give you the history of a few cases of each class:

Class 1—Case 1.—Bay mare—8 years old—standard bred with quite a burst of speed. This mare was clever and all right in every way, both in the stable and in all kinds of harness when not in heat, but during that period, kicked, switched, and urinated, gradually getting worse.

This mare has been operated upon about two years, and the results were immediate. This man's wife and children drive her anywhere and feel perfectly safe. She had been acting badly for about three years.

Case 2.—Spotted mare—6 years old—in livery and used on a mail wagon. Clever in every way when not in heat, but, during estrum, could not be used at all and was growing worse. Had been kicking about a year, but, some months previous, only switched. This mare was operated upon six years ago. Results were immediate. I met a lady driving her about two weeks after she went home.

This same history will cover a great many cases of this class.

CLASS 2—CASE 1.—Bay mare—10 years old—pacer. At first, she only kicked during regular periods of estrum, but, later, she would kick any time. Had been mean about two-and-a-half years and was getting worse. Was operated upon in 1914, was taken home and put to work. Improvement was noticeable and in two months was kind and gentle and at the present time is still all right.

CASE 2.—Sorrel mare—three years old—draft breed. She had been mean from a suckling up to the time of operation. It was not safe to get anywhere near her, either in the barn or out. She would chase you if you came anywhere near her in the lot.

They tried to break her to harness but had to give it up. This mare was operated upon in the spring of 1915. The left ovary was cystic—weight 7¾ ounces, the right one 1½ ounces. This mare has been clever ever since the operation. She has been broken to harness and works well. Owner's statement says, "she can't be made to kick."

CASE 3.—Bay mare rising five, 15.3 hands high, weight 1050 pounds, high bred (of the Wilks family) and showed considerable speed when broken to harness at three-year-old.

During the winter (then coming four years) she became an "out-law"—did about all the stunts on the calendar, could not be subdued, and was turned out to pasture in the spring, where she remained until after she was operated upon, the following August. She again ran out in the pasture until the first of October. Was taken up and an attempt was made to work her, but she still kicked and switched as badly as before. The following May, she was tried again but her disposition had made no improvement. Up to this time she had remained in fair flesh, but she began to lose flesh even though she was idle, becoming quite poor. She was dealt, late in October to a second party, who paid no attention to her, except that she was properly cared for; again running out in pasture, she took on flesh, becoming quite fat, and during the latter part of July was again taken up, when she appeared perfectly docile, took her work kindly and ever after displayed good manners, both in and out of the harness. About 18 months after the operation she became more docile, and at the end of two years was as pleasant as when she was three, which was fine. Since starting this paper, I have received word that she is still fat and tangible, kind and agreeable, showing her age but little and giving satisfaction to her owner.

CASE 4.—Brown mare, roadster, near 20 years old, at the time of operation. Had been bad only about 3–4 months previous to being operated upon. She quit her kicking and squealing in the barn, but is still a little troublesome when hitched on the street near strange horses, the owner says that he is well pleased with the operation.

CLASS 3—CASE 1.—Brown mare, cob—11–12 years old. She had been kicking and doing about all of the stunts that a horse can do for at least five years. She was a dangerous animal either in the harness or in the stable. One week after the operation, she was discharged and put to work. This mare displayed good manners, both in harness and in the stable immediately upon returning home. The owner's wife drove her to town a short time after, a distance of thirteen miles.

NOTE. Both ovaries were hypertrophied, showing conclusive evidence from the results obtained, and the condition of the ovaries, that the operation was the only means by which this animal could have been made useful.

DISCUSSION

DR. QUITMAN: I would like to ask Dr. Fulstow if he has ever performed the operation of clitoridectomy for the class of cases that has been described and how that operation compares with oophorectomy?

DR. FULSTOW: Yes, I have performed clitoridectomy a number of times before doing oophorectomy, and it did not do any good. In one of those cases that I did operate by oophorectomy, it did not cure the mare; she was improved some. Later I removed the clitoris, and she got all right after that.

DR. G. A. ROBERTS: There is no operation that we have been doing in the South that has met with as much public favor as oophorectomy. It is true that there are cases that will be improved and those that will not, and we have not had a sufficient number of them to be able to divide them as Dr. Fulstow has, into different classes. However, out of thirty-one that we have operated on in the last three years, there was only one of them that did not respond beautifully to it. One of the things that might be interesting to those of you who are not familiar with the southern condition—is that we use the mule very largely down south. Out of these thirty-one we have operated on four mare mules, with invariably splendid results. And in every case of nymphomania we have never failed in a single instance to find cystic conditions of the ovaries; we have made some attempts, from an experimental standpoint, to try to remove only the affected ovary, leaving the normal ovary present,

in some cases to see what the effect would be. In other cases, in horse mares, to see by the removal of the diseased ovary, whether that would effect a cure and the results were very satisfactory.

In the case of the four mules, the sound ovary was left. We were positive, as far as we could tell, that the one ovary was affected and the other normal, from manipulation of it. The one ovary that we removed was larger than my fist. Unfortunately we could not weigh it because in the attempt to remove it we had to rupture it to get it through the opening in the vaginal wall, but in less than four months afterwards, after the animal had completely gotten over the habit of kicking, squealing and biting, we received a report some time ago that there was a return of the same condition, within less than four months; that the animal was just as bad as she ever was. On a re-operation, we found to our surprise the second ovary, which at the time of the first operation was perfectly normal, was just about in the same condition that the first ovary was.

In every one of these mules, however, with the removal of both ovaries, perfect results were obtained from them; and, as I said, there was only one case in which the results were not successful. We did operate on one mare, as Dr. Fulstow mentioned in his classification, that was kicking all the time, it did not make any difference what the circumstances were. It belonged to a rural route carrier, and he gave her away because nobody could work her at all.

We had in our town an old gray mare that was driven to a laundry wagon, an animal that had been for years getting worse and worse, until finally they could not get a colored man to drive her at all. We had been asking the owner for a couple of years to allow us to operate on her. Finally he said: "kill or cure." We operated, and in a month's time afterwards of the thirteen animals that the laundry possessed, there was not a better driving animal, of a more gentle disposition and more easy to drive than this one. The mare was over twenty years of age at that time.

I brought the mule proposition in because mules correspond to virgins, and they have not apparently copulated. Yet we found in mare mules conditions similar to those found in horse mares that caused large cystic conditions of the ovaries. In many cases the condition was confined to one ovary, but in some cases to both ovaries; in some instances the cystic formation was not larger than the end of your thumb; in other cases the ovaries were as large as two fists and could not be readily removed without rupture of the cyst first. In every one of these cases from the mildest to the most extreme, they responded beautifully to the operation with the exception of the one case mentioned.

With reference to safety, we have been extremely fortunate, or lucky, because of the thirty-one, we did not have a single accident whatever happen. In some other attempts that have been made,

there have been some losses from hemorrhage and some septic conditions following, but we were extremely lucky in the number of animals we have operated on in having no unfavorable consequences. So far, there is no operation which has given us so much favor in the eyes of the public in overcoming these unsuitable conditions in animals that were absolutely worthless before the operation, which rendered them perfectly tractable and as good as any other animal after the operation.

DR. ELLIS: The doctor has referred to a case of mine that I reported. I wish to say just a word because we might find some other cause for a return in my case. The conditions were identical, in one sense, that one ovary was very largely cystic, and the other was normal; but both ovaries were removed at the same time, and yet we had a return. It may have been a psychical condition and it may have been that the handlers of this mare were so determined that she would not be cured of that habit, or that vice, by the operation, that they used every test they could to try to see whether she would not kick again, and she accommodated then. A mare mule that I reported about fifteen or sixteen years ago, was giving milk, I called it lactation of a virgin in mules. That was one of the most remarkable cases of nymphomania I ever saw in a female animal.

DR. ROBERTS: Did you operate on that case of lactation in the mule?

DR. ELLIS: No, not on the mule.

DR. ROBERTS: We had one some months ago that had periods in which she would give from a pint to a quart of milk. We tried our best to get the man to allow an operation, but we were not successful.

DR. BLATTENBERG: I would like to ask the gentleman who operated on the mare what method of restraint was required.

DR. ROBERTS: We had a fellow at the twitch, one at the halter and one at the tail. Unfortunately, we have not had an opportunity to get the subject confined. We put a side line on over nine-tenths of the cases. We have simply had the side line on out in a lot. We try to keep them moving so they won't get down. We have attempted to use some local anesthesia. Some of them have stood perfectly still, and others we have had to raise up off the ground in order to keep them still.

DR. LACROIX: I was very much interested in Dr. Fulstow's paper, particularly in the restraint that Dr. Blattenberg has just spoken of. I believe the average practitioner who is not doing this operation, is a little timid in undertaking it. The matter of restraint is an important one. If, however, you administer from an ounce and a half to two ounces of chloral hydrate into the rectum after having an assistant empty the contents of the rectum, the restraint is not difficult. I have handled range animals, young ones a year and a half old, in an improvised chute. I have handled them down on the ground and almost every other way. About the bal-

looning of the vaginal wall, I think the unskilled operator may have some difficulty if he depends upon that to carry out the operation successfully and conveniently. The novice, or rather the man who is a little timid about doing this operation, would be a little slow in his technique, and by the time he gets ready to make the incision in the vaginal wall, the ballooning will have subsided. I use, in some cases, a blunt pointed embryotomic hook. I do not bother about injecting fluids or ballooning. By tensing the walls of the vagina, one can make the incision very safely. In other words, I think it is well in each instance to locate by palpation the arteries. Locate the aorta and the iliac branches, and in this manner one can readily avoid puncturing. With regard to results, I have not had occasion to classify them as the doctor did, but it is a well known fact that in conditions that have been chronic, the results, if attained at all, do not come very fast, even several months being not uncommon.

Dr. Roberts: I would like to ask Dr. LaCroix if he did not get a good deal of hemorrhage when he used chloral hydrate. We have used it a number of times ourselves for that express purpose, but invariably we got so much hemorrhage that we tried to use some other method of anaesthesia and control, and at the same time be humane. We tried so far as we could do so to avoid that hemorrhage.

Dr. LaCroix: I would say briefly that I have had no trouble with hemorrhage. It may have occurred but I have not noticed it and have had no losses due to hemorrhage.

Dr. Merillat: I think you old surgeons who have done this operation so much take for granted that everyone can do this operation with great ease; while, in fact, there are many ugly stumbling blocks in mare castration that the new operator meets. You are giving an entirely wrong idea of this operation by saying that, Zip! anybody can go in the vagina and get the ovary. To do it is not very easy. I find that new operators often fail to find the ovaries very easily. It is not just such an easy matter to put the hand through the abdominal cavity and find the ovary. Sometimes the new operator fumbles quite a long while before the ovary falls into his hand. Can you guess the reason why? So often the great mesentery lies between the hand and the ovary, and he hunts and hunts and hunts, and he is pushing the ovary away from him all the time. There is a curtain between him and the ovary. I have met that so often myself, and I had to do some awful things in there before I learned what was the reason. A pretty experienced surgeon confessed to me, after he had performed such an operation, that he found a good sized hole in the mesentery when he opened the abdomen on a post mortem. In this case he had grabbed the mesentery, and went over the mesentery and made a nice opening through it. That is one of the stumbling blocks in intra abdominal surgery with the hand, that you operators meet, not only in the

castration of mares, but in all kinds of intra abdominal work, which you must always have in mind. I think if the operator has this in mind at the moment he enters the abdomen, he at once manipulates his hand in such a way as to overcome it. That is, if you are hunting for the left ovary with the right hand, you would dip the hand down and get under the bowel, and you would come up into another space where the ovary would fall right into the fingers. That is one of the stumbling blocks of this operation. I have noticed in veterinary association meetings those who have done the operation quite often do it rather poorly in many cases.

Another thing that was not touched on was the possibility of making brood mares out of some of these awful kickers, and since Dr. Roberts has spoken of operations that were successful, that opens up a means of conserving such animals for breeding purposes by removing only the affected ovary. In the future, in my operations, I shall only remove the affected ovary. I believe that it is sufficient, and will conserve a breeding animal, and undoubtedly does just as much good in restoring her usefulness as if both had been removed.

DR. FERGUSON: The class of mares that I have operated on has been mostly extremely vicious mares, and my technique for operating has been to confine them in stocks, and I consider that none too good a confinement. They were all mares that would fight considerably; and, in addition to confining them in the stocks, with a sling under them, and ropes over them, and hobbling them to the floor, I always anaesthetize with chloral hydrate, from an ounce to two ounces, according to the size of the mare. The result of my experience has been along the line of Dr. Fulstow's. A considerable time elapsed in most of my cases before any improvement was noticed. One mare, in particular. was a mare that at one time had a very sore neck, and after operating on her, I cautioned the owner to be very kind to this mare for some time, and he was kind to her, treated her nicely, and she was improving apparently, making a nice recovery from her mean disposition. He sent his man after some baled hay, with this mare and another horse, one day, and they got in a position where they had to do considerable backing, and they had no breeching on the harness, and it started this mare up again, the irritation of backing, the pressure on the neck started her to kicking again, and it was over two years before they could get the mare back so that she was as good as she was six months after the operation; but eventually she made a nice recovery.

The incision, in my experience, is the hardest part of the operation. I have had the accident that Dr. Merillat referred to; in one case that I operated on I found the ovaries without trouble. I prepared this mare by fastening her for thirty-six hours, and during that time my stable man reported that she pawed considerably. I operated on her, and about half an hour after the operation we

found this mare with her feet up in the manger. We removed her from that position. In due time she was fed a little meal. After eating, she seemed to be inconvenienced, and we gave her a little treatment, and she eased up in time; but after the next meal she developed the same symptom, and continued along that line for the neighborhood of a week, or eight days. In the meantime we had to relieve her rectum, and eventually she had a bad turn and we took her in the country a mile and killed her and made a careful post mortem examination. I found that in removing one ovary I had taken the omentum, ovary and all, which caused a protrusion in the bowel and strangulation, and that would have caused her death. I thought, at first, that possibly that mare was afflicted before the operation, that she had had that accident, but talking with Dr. Merillat and comparing notes, I think there is no question but that the trouble was in removing the mesentery at the time of removing the ovary.

DR. FULSTOW: I would like to ask Dr. Roberts how he can tell the difference between a true cyst and a Graafian follicle, when it is only the size of the end of his finger nail, before he takes it out of the mare, in case he wants to leave one ovary in there for breeding purposes?

DR. MERILLAT: You can do that very easily. Your question is how to differentiate between the Graafian follicle and a cyst?

DR. FULSTOW: Before you take it out of the mare, how can you tell the difference between a true cyst and a Graafian follicle?

DR. ROBERTS: I do not know that we are enabled to. Unfortunately, we have not made the different forms of examination in the two classes of animals. In our mares we have never made,—and I regret to confess it—a rectal examination, and we should have done so. We have always found the circumstances as wanting something to be done, and we have always gone ahead and done it. On the other hand, in cows, we have not made the vaginal examination, but we have made the rectal examination, and in the cows there might be some difficulty in the first inference as to whether it was a Graafian follicle or cyst. Invariably with the cow we have always made a re-examination some time afterwards so that if it was a Graafian follicle, it would have had time to have ruptured. In a purely surface examination, I do not believe it is possible to make a distinction between the two. On the other hand, the Graafian follicle is so sloping and so different from the bulginess of the cyst, that we have considered any way we were capable of differentiating between them.

DR. MERILLAT: If Dr. Williams were here, he would tell you just how to do that. Dr. Williams differentiates abscess, cyst, yellow body, through the rectal wall in the palpation of the ovaries of the cow, and I know that he does it because Dr. Cotton, just a few days ago in Minnesota, checked him up in some of his diagnoses on a post mortem, and he found that Dr. Williams was right.

So this indicates to me that we have not developed our full possibilities in palpations of the ovaries. But what Dr. Fulstow meant was, even when your hand was on the ovary in the abdominal cavity, during your operation how can you differentiate?

DR. FULSTOW: Yes, so that in case you want to leave this mare for a brood mare, you could leave the other ovary in.

DR. ROBERTS: We have always satisfied ourselves with the manipulation while we were in there. If we found one ovary was much altered, and the other nearly normal, we went on that basis. We believe it can be done just as readily beforehand by rectal examination.

DR. MERILLAT: What I had in mind in referring to the unilateral operation was just what Dr. Roberts says. We found one ovary enormously large, unquestionably diseased on account of its size, as big as a baseball or cocoanut, and I should remove that only.

DR. LACROIX: I understand you, Dr. Merillat, to refer to differentiation in the cow only, did you not?

DR. MERILLAT: I did, as far as Dr. Williams' manipulation was concerned.

DR. LACROIX: You will recall there is a difference in the density and in the thickness of the covering of the ovaries in the cow and in the mare. In my own experience, I have not been able to distinguish,—at least I am not satisfied with my diagnosis, in the mare; I have not been able to readily distinguish a Graafian follicle from a cyst. The heavy dense tunica albuginea does not allow much bulging, in the cases where I have tried to distinguish, so that I cannot positively say that it is easy to distinguish between the two conditions in the mare, in my experience. It is easy enough in the cow, but not so easy in the mare.

DR. MURPHEY: In regard to the cow, I should like to offer just a little comment. We have been making a study of this problem, to tell whether they were cysts or Graafian follicles, by dissecting sections of a number. I have graduate students working on that problem now. I am inclined to believe there is no distinction between cysts and Graafian follicles in the early stages of the cyst, at least. In the follicles that are undergoing degeneration, that have largely developed so-called atresia of the follicle, there is no superficial distinction between them and the follicle. There is some work that has been done recently in Louisiana. I am not sure of the animals. There was no such distinction found. In that particular work there were some physiological experiments performed to determine the character. In those that showed any atresia, or cystic condition, they have found that the fluid in the atresia follicles and well-developed cysts, contained an enzyme or ferment, I do not know just which term to use, but at least it had the power of digesting protein, and that is possibly the explanation of the formation of the cysts. As to the surface, we have been unable to find any distinction. The problem was suggested, I be-

lieve, by Dr. Bemis, to find whether there was any surface difference between the Graafian follicle, or atresia follicles and large cysts. So far our studies have shown there was no point of distinction. I question some of the statements that others make in regard to their ability to diagnose by surface differences.

DR. ROBERTS: We would like to say also that we have done a great deal of work histologically, and that we have found a cyst of two different forms. We have found one cyst that is not any more than a large Graafian follicle, and again we have found a large portion of our cysts as a result of degeneration of persistent corpus luteum, in which we have a large number of sections, showing different degrees of degeneration of the corpus luteum.

DR. CAMPBELL: I understood Dr. Fulstow to classify these cases into two divisions: the large one, where there was disease of the ovaries or other degenerative organs; and the smaller classes, containing an appreciable portion of the cases where he said it was due to heredity. I understood him to say that he found the ovaries normal there.

DR. FULSTOW: That is right. I have noticed a good many mares I treated, and I found no diseased condition whatever in the ovary.

DR. CAMPBELL: That being the case, I do not see where there is the safety in your idea of leaving one ovary and removing the other, because you think it is good. I understood Dr. Roberts to say that every one of his thirty-one cases were cases where there were diseased ovaries. Dr. LaCroix did not mention whether all of his were diseased or not. It seems the discussion has been about one class of cases, and the paper was read about a broader division of it, and the essayist being right, and we know that he is, it is not going to be safe to leave one ovary in there, even if it does seem to be normal, if the mare is a bad one; it is necessary to take them both out.

DR. FULSTOW: I think a good many times that mares will kick, mares with mean dispositions, where we haven't any degeneration of the ovary, mares will kick just from irritation; and by removing the ovaries you correct that irritation.

DR. MERILLAT: We do not understand that, Doctor.

DR. FULSTOW: I said I had treated, or operated upon a good many mares that kicked, where I did not find a thing wrong with the ovaries, nothing wrong with them whatever, but the irritation set up at the time of estrum is what produced the kicking. Their disposition was mean, and just that little irritation made them kick.

A MEMBER: They were improved by the operation, were they?

DR. FULSTOW: They were improved by the operation, yes.

DR. MERILLAT: In a confirmed kicker, how long after the operation was there any manifest improvement?

DR. FULSTOW: The mare that I reported in class 3 had been kicking for five years. I think she was kept about ten days and re-

turned home and immediately put to work, and was kind and gentle in every way ever since the operation. This mare has been operated on about a year, and she could not be used either in harness or out of harness previously; they could not go into the stable or anywhere near her, and she was improved right away after being operated on. Then some of the other class have gone for six months, two months, and one went two years.

DR. MERILLAT: That is a good point to bring out about the spaying of mares. Practitioners often draw the wrong idea of spaying mares by expecting immediate improvement. Some of our cases have been improved after ten or eleven months, and a splendid improvement too. Others have improved after three months. I have in mind now a case of a fine chestnut draft mare that became vicious rather suddenly, and was perfectly useless; a splendid mare, worth easily $300, that was spayed and sold a month after the operation because the operation was not a success, sold for a small price. I had occasion to see that mare three months afterwards, and found her driving around on a single wagon, perfectly tractable. That is an important point in the prognosis of the disease.

DR. ROBERTS: In every case of the thirty-one we have had, there were diseased ovaries, but we have not operated where we did not think there was real need for it. On the other hand, I hope that we will consider this proposition as essential, from the remarks of the Governor here last night with reference to humanity.

With reference to the last case referred to, there was a great long iron pipe laid alongside of the barn where we went to operate. The owner said, "you see that bent iron pipe? That is what I have been using on this mule mare to get her to do the service I want of her." It was simply that there was such an irritation that the animal was not accountable for its actions whatever. It was simply a case of humaneness to operate on such a case. I believe there are many animals today that are being brutally treated under the same circumstances. This fellow said he bought her from another man, saying, "I will make her work or break her damn neck, one or the other." That is just the way a large number of them do. We have in every case, excepting one, found a splendid improvement.

—Flight-Lieutenant Rochfort Grange, son of Principal Grange of the Ontario Veterinary College, was recently wounded in the shoulder by a bullet. For his services at the front he has been awarded the Distinguished Service Cross.

REMOVING RETAINED PLACENTAE BY INJECTING PLACENTAL VESSELS WITH SALINE SOLUTION*

DR. R. R. SHAW, Sidney, Ohio.

The problem of removing the placenta other than by the manual method has been given much consideration by prominent veterinarians and associations for several years. The method of manual removal has been in vogue since veterinary science has existed and up to the present time it has not received much elaboration. The method as practiced has numerous objectionable features which are dangerous to both operator and patient. Among these are infection, traumatic injury to the uterus and severe metritis. The usual method is also objectionable on account of insufficient arm-length.

The new method we are here offering the profession theorized and developed by Dr. D. L. Englerth and myself is as follows:—the technique of our method is very simple and the outfit can be purchased at very little cost. Before describing the operation I shall give a list of the articles that make up the apparatus:

1—quarter inch canula 10 inches long
1—rubber tube 10 feet long
1—pump and pail
2—gallons of normal salt solution.

It is important that the umbilical cord is intact and accessible to the operator. A large radicle of the vein may be used if part of the placenta has been removed.

The canula is introduced into either the vein or the artery of the cord through a longitudinal incision and is held in place by a ligature. The tube is then attached to the canula and after attaching the other end to the pump the operation begins. The saline or antiseptic solution is slowly pumped into the placental tissue, which upon being engorged with the liquid behaves similar to erectile tissue. As the placenta distends the liquid by hydrostatic pressure detaches it from the uterine surface. The choroid venules become distended and rupture, permitting the solution to pass to the uterine surface of the placenta. The villous processes are detached and there is a uniform separation of the entire membrane.

*Read before the Northwestern Ohio Veterinary Medical Association, Toledo, Ohio., February 21st, 1917.

Uterine contractions are stimulated and thus aid in loosening the attachment. After the membranes are completely detached a moderate traction will deliver them.

CLINICAL REPORT:—October 9, 1916, I was called to see a cow that had been in labor six hours. The delivery was affected by traction which left the patient in a very weakened condition. I instilled a gallon of saline solution into each vein and had a complete delivery of the placenta in five minutes.

REPORT NO. 2:—November 7, 1916, I was called to see a cow that had passed part of the placenta leaving the remainder attached and protruding. One-half gallon of saline solution was instilled into the placental tissue through one of the large radicles of the umbilical vein, which immediately detached the placenta.

REPORT NO. 3:—My third case was a firmly attached placenta in a cow which I found immediately after delivery. A gallon of antiseptic solution instilled through the umbilical vein detached it in two hours.

Peroxide of hydrogen or permanganate of potash solution may be used instead of the saline solution. The operation is less effectual where the placenta has been meddled with in futile attempts to detach it. In such cases it may be difficult to find the cord. It is likewise less effectual after the membrane has been weakened by decomposition, which leaves the walls of the vessels too weak to support the solution. The operation is one that should be practiced as soon after delivery as possible.

DISCUSSION

DR. MERILLAT: The subject of retained placenta to-day I think is attracting more attention in the veterinary profession than any other subject because of its relation to abortion disease, which is recognized now as the great American scourge. That this disease is threatening our live stock industry is pretty well understood. I believe that our best investigators on abortion disease maintain that the retained placenta is one of its manifestations. When the placenta does not deliver in the proper time the delay is oft times said to be the work of the bacillus of Bang. An animal thus affected is a dangerous subject because it may contaminate others.

As regards the prevailing modus operandi; it is becoming customary in the veterinary profession to remove the placenta manually only when it can be detached with ease. Forcible detachment is not practiced at all in the good establishments where valuable animals are involved. Our best veterinarians to-day rec-

ognize the fact that the tearing away of the retained placenta is unwise, but the veterinarian working in his own field is handicapped in that his customer when calling upon him to deliver a subject of an attached placenta is expected to remove it and if he does not do so he would be criticised. He therefore proceeds to do the wrong thing, tearing it away against his better judgment. Now-a-days many recommend it be left alone and treated with preservatives until it can be more easily detached some few days hence.

Now comes this remarkable system which to me is such a surprise that I shall suspend judgment on its merit until I hear more about it. If Dr. Shaw's method is as effective as his paper seems to indicate we have heard something that will revolutionize the old plan of handling after-births. Naturally he has made history. This system will enable us to leave the placenta alone until it is ready to remove. If this method does not always detach it I can see that the method will do less harm to the subject than the manual one. I am certainly pleased that Dr. Shaw has brought this subject before you and am especially pleased to note that he has tried it out well before giving it publicity.

I cannot claim to have any broad experience in obstetrics as most of the knowledge about such matters I have gathered through these kinds of discussions in association meetings. I therefore approach this subject very cautiously and am not expecting you to take my remarks too seriously.

DR. MAYO: I want to thank Dr. Shaw for presenting something new, because I try to keep pretty well posted with veterinary progress in recent literature, and this phase of the work has never been touched upon before. I also want to take issue with Dr. Merillat and his part of the statement as based on Dr. Williams' work, that all cases of retained placenta are indicative of abortion. I do not believe it, and I want to emphasize my statement now. We had retained placenta 40 years ago and I know we never had any deaths from this disease. I have seen it on the range. I will admit that it is much more frequent with contagious abortion. You know when a man gets to working with some special subject and gets all wrought up with it, everything that comes along he naturally or unconsciously points to his theory to show that he is right in his analysis.

DR. MERILLAT: I think that Dr. Mayo has misunderstood me. I will try to make a corrected report about this. I said that retained placenta is generally caused by abortion disease and I still maintain so. Those cases on the range 40 years ago might have been due to some other cause, and then again they might have been caused by abortion. There are not many causes of metritis in our animals except abortion disease. It is better to suspect the retained placenta as a pest than to pass it off as a triviality on any occasion, and I am not so sure that these animals that Dr. Mayo saw 40 years ago did not have contagious abortion. We know conta-

gious abortion to-day because we study it. We know that contagious abortion does not always manifest itself by abortion. Abortion phenomena represent a different condition than abortion disease. We look upon abortion disease to-day as a general venereal disease, manifesting itself by premature expulsion of the fetus and other symptoms, such as retained afterbirth and sterility. I am not insisting that all cases of retained placenta are caused by contagious abortion, but that they are all caused by metritis, and that metritis is usually due to abortion disease.

DR. HOUSER: Dr. Shaw first called my attention to this method of removing retained placenta last October. At first I injected about 3 gallons of saline solution, then proceeded with the old-time manner of removing it. I found the injection was a great help. In all cases where I have tried it I find that the placenta was expelled in from 2 to 6 hours after the injection. I have had from 15 to 20 cases.

DR. NEAL MCNEAL: Dr. Shaw told me about this system about a month ago and I have tried it on 7 cases with very satisfactory results. I simply injected about 2 to 3 gallons, but I believe that it was a little too much, less would do. In our cases the placenta came away in from 8 to 12 hours after the injection. We never had to drag it away.

DR. ADAMS: Tell us the difficulty of your experience in trying the injection.

DR. NEAL MCNEAL: The vessels are sometimes very hard to bring out far enough to insert the tube. I endeavor to bring them back with a pair of long dressing forceps, with which I bring the vein out where I can insert the tube.

DR. MERILLAT: Do you believe that the uterus at this time would be light enough to be retracted with forceps?

DR. MCNEAL: Yes.

DR. MERILLAT: Have you ever used Albrechtson's forceps to facilitate matters?

DR. MCNEAL: I have never tried them.

DR. MERILLAT: It has just occurred to me that frequently the vessels would be so far back it would be difficult to find them.

DR. MCNEAL: Yes, I do find them in that condition quite often. I, however, have not had much difficulty since I commenced to use dressing forceps.

DR. HOUSER: Generally I work the pump myself and as soon as I commence to get a good heavy pressure I quit. Previously I used to inject 2 to 3 gallons but now I find that a gallon is plenty.

THE ETIOLOGY OF HOG CHOLERA (PRELIMINARY REPORT)

FREDERICK PROESCHER, M.D., AND HARVEY A. SEIL, Ph.D.
Pittsburgh, Pa.

The investigations of de Schweinitz and Dorset[1] 1903, and Dorset, Bolton and McBryde[2] 1905, have shown that the causative agent of hog cholera is a filterable virus. The findings of these authors were corroborated by Poels[3] in Holland, Ostertag and Stadie[4], Wasserman[5] and Uhlenhuth[6] in Germany, Hutyra[7] in Hungary, the Board's Laboratory in England[8], Theiler[9] in South Africa, and by others. The virus is filterable through Berkefeld, Heim, Pukall and Chamberland filters. According to Von Betegh[10] it is retained by the ultra filter of Bechold. Uhlenhuth states that a part of the virus is retained by all filters, since the filtered virus is not as potent as the unfiltered. In spite of numerous painstaking investigations, the virus of hog cholera has neither been rendered microscopically visible nor has it been artificially cultivated.

Since other filterable viruses as poliomyelitis[11], rabies[12] and variola[12] can be stained and thus become visible under the microscope, and since these can be artificially cultivated with the original potency retained to such a degree that the respective disease can be reproduced in animals by distant subcultures, the same method of procedure which leads to the discovery of the above mentioned microorganisms was applied to hog cholera. One of us (Proescher)[12] has shown that filterable viruses possess characteristic staining properties, i. e., they can be stained only with certain aniline dyes belonging to the thiazine family such as methylene azure, toluidine azure and methylene violet, either as free base or as the readily dissociated carbonate. The inorganic acid salts are not suitable. Furthermore, the filterable viruses consist of lipoprotein explaining satisfactorily their filterability by virtue of a greater flexibility due to the lipoid component. This latter renders the virus a solvent for the free dye base whether present as such or set free by dissociation.

Since the virus of hog cholera circulates mainly in the blood stream, the greater part of this investigation was restricted to the blood. Blood smears were made from the blood of six pigs in the advanced stages of hog cholera, and also from the blood of twenty-

eight pigs artificially infected with virus. These last pigs were killed on the eighth day of the disease, and samples of blood were then taken. All the pigs were examined post mortem, and the characteristic lesions of hog cholera established.

The air-dried blood smears were fixed for half an hour, either in methyl alcohol or in a 5% aqueous solution of sodium tetravanadate and the fresh smears of a 5% alcoholic ammonium uranicitrate solution at 60 degrees C. for the same time. The smears from the last two fixations were thoroughly washed with distilled water and stained in a 1% aqueous solution of methylene azure containing 1% of phenol. The smears fixed in methyl alcohol were dried and stained as above. The cover slips were floated on the methylene azure solution to prevent precipitation for about eighteen hours, then thoroughly washed with water, dried and mounted in paraffin or cedar oils.

The smears fixed in methyl alcohol showed the following: the red cells were stained a bluish-green; the nuclei of the leucocytes either blue or a metachromatic violet; the protoplasm of the polynuclear leucocytes either colorless or a faint blue. The granulation of the neutrophiles and eosinophiles were not differentiated, while the granulation of the basophiles were stained metachromatically. The protoplasm varied from a slight to a deep blue. The blood platelets were stained a very faint blue. Besides these common elements, oval or irregularly outlined cellular elements which showed a deep blue oval nucleus surrounded by a greenish protoplasm, were seen. These cells varied in size from 20 to 40 micra. They either occur isolated or in conglomerate masses. On close study and by the use of other fixing agents which preserve the cellular structure better than methyl alcohol, these cells are unquestionably exfoliated endothelium cells from the walls of the vessels.

The protoplasm of some of these endothelium cells include two well defined structures. The first occurs either as deep blue thin filaments about 6 to 7 micra in length, or as rods simulating bacilli about 2 to 3 micra in length, arranged in parallel chains which are usually found in the distal protoplasm or generally distributed over the cell, sometimes even in the nuclear membrane. Besides these, deep blue cocci-like formations, or isolated cocci, are noted. All these structures are undoubtedly mitochondria, a normal constituent of the protoplasm which is at times mistaken for either a microorganism or one of the developmental stages of microorgan-

isms. Our recent investigations, to be published in the near future, show that these polymorphous structures found in the protoplasm are normal cell constituents which are identical with the mitochondria first described by Benda[13], who made it visible by a complicated staining method in the sex cells. We may mention briefly that our staining method demonstrates mitochondria in the epithelial cells of the integument, as well as in the interstitial cells of the testes, and renders it visible in certain pathological conditions of the nerve cells.

The second structure found in some of the endothelium cells is a very small diplococcus, uniformly less than .2 micron in size just on the limit of microscopic visibility. These diplococci are stained either a deep blue or a metachromatic violet. Their form is either spheroid or ovaloid. Some of the endothelium cells are entirely filled with these cocci which are readily differentiated from the polymorphius mitochondria by their uniform morphology and size. They are also found extracellular between the red cells or attached to them as diplococci and occasionally as short chains consisting of four to six cocci or sometimes grouped in clusters. Now and then the cocci are found in the protoplasm of the polynuclear leucocytes. At times the cocci are also seen embedded between peculiar deeply-stained, agglomerated roundish lymphocytic-like cells. The size of these latter is about 7 to 8 micra, exhibiting a large nucleus and a very small barely visible cytoplasm. These cell masses undoubtedly originate from the walls of the vessel and the histogenic lymphocytes. The micrococci are occasionally seen within the nuclei. Some of the cells undergo partial metamorphosis showing pyknosis and karryorhexis of their nuclei.

The cytoplasm of the endothelium cells as well as of the large lymphocytes shows peculiar cell inclusions in the form of either dark blue or blue roundish formations similar to the Guarnieri bodies, characteristic cell inclusions of variola. Their size varies between 2 to 4 micra in diameter. They are either stained a uniform blue or show a granular structure. They are distributed throughout the protoplasm or may be attached to the nucleus.

These cell inclusions were uniformly found in advanced stages of the disease.*

Smears fixed by ammonium uranicitrate preserves the endothelium cell in a most remarkable manner. The mitochondria and the microorganisms exhibit a well defined differentiation while the red cells and the majority of the white cells merely appear as outlines and sometimes are hardly visible. The extracellular organisms are generally found in groups, due probably to the fixation. The differences between the mitochondria and the microorganisms are well pronounced. The inclusions in the endothelium cells are also clearly stained.

The microorganisms found in the blood were also found in the urines of three pigs artificially infected with hog cholera. The fresh urine was centrifuged and smears made from the sediment. These were fixed and stained as in the case of the blood. Microorganisms occurred in large numbers sometimes as isolated cocci, and quite frequently in rather dense agglomerations. These findings satisfactorily explain the highly infectious nature of the urine.

The microorganisms just described were found in the blood of all the pigs examined. The method of staining, the localization of the cocci in the endothelium cells, their uniform morphology, their minute size which explains their filterability, the formation of cellular inclusions, all properties of the known filterable viruses, indicate that these microorganisms are the causative agents of hog cholera. Of course, the absolute proof is the cultivation of the microorganisms and the production of the disease by distant subcultures. This artificial cultivation is at present under investigation, and we hope to report upon this phase in the near future.

The changes in the blood picture in hog cholera closely resemble those of typhus fever (typhus exanthematicus) in humans. A great number of endothelium cells is found in the blood stream

*These cell inclusions are altered mitochondria. Our unpublished study of the Guarnieri bodies in variola vaccine indicate that these inclusions are disintegration products of mitochondria. While the microorganisms multiply in the cell a part of the mitochondria undergoes a chemical change, probably a splitting off of the lipoid component, thus giving the remainder of the molecule a chromatophilic affinity for the common strains. This is confirmed by the fact that unchanged mitochondria occurs within the inclusions. This change may be due to the diffusion into the cell of the toxin generated by the virus. The mitichondria, too, appears to play an important role in cell protection probably causing the formation of antibodies. It is a significant fact that the amount of the mitochondria is increased during the infection.

in both. One of us (Proescher)[14] has shown that the causative agent of typhus fever is primarily found in the endothelium cells and also free in the blood stream. The morphology of the microorganisms closely resembles that of those in hog cholera and a diplococcus is also present although somewhat larger in size. The pathological changes in hog cholera are analogous to those found in typhus. In the peracute and acute cases of hog cholera, the disease is a septicemia with a high continua. The pathological changes found in uncomplicated cases are hemorrhages in the skin and internal organs. In hog cholera, as well as in typhus, a bronchial pneumonia may be found. The only difference is in the intestinal canal. In hog cholera, necrosis is occasionally evident, which is not the case in typhus fever in humans. Another similarity is the necrosis of the distant organs, such as of the ear and snout in hog cholera, and of the extremities in typhus. This similarity points to the probability that the primary seat of the disease in hog cholera is found in the arterial capillaries. This was demonstrated histologically by Dr. E. Fraenkel[15] in typhus, showing a so-called periarteritis (periarteritis nodosa) of the small vessels of the skin with a proliferation of the endothelium cells of the vessels and a consecutive thrombosis. A careful histological examination in hog cholera has not yet been made but the above analogy to typhus in the pathological changes in hog cholera indicates a probable similarity of disease causation. A histological study of the changes taking place in the vessels caused by hog cholera is in progress and will be reported in a future paper.

We wish to express our indebtedness for the valuable assistance given us by Dr. John Lichty, and Dr. D. W. McAhren of the Purity Serum Company, while engaged in this investigation in Sioux City, Iowa.

REFERENCES

(1) DE SCHWEINITZ AND DORSET. A Form of Hog Cholera not caused by the Hog Cholera Bacillus. *Bureau of Animal Industry Circular 43*—1903.

(2) DORSET, BOLTON AND MCBRYDE. The Etiology of Hog Cholera. *Bureau of Animal Industry Bulletin 72*—1905.

(3) POELS. Verslag van de werkzaamsheden der Rijiksseruminrichtung. 1904-1905.

(4) OSTERTAG UND STADIE. Weitere Untersuchungen über die Filtrierbarkeit des Virus der Schweineseuche und Schweinepest. *Zeitschrift für Infectionskrankheiten, etc. der Haustiere.* Vol. II, I and III. 1907.

(5) V. WASSERMAN. Wissenschaftliches über Schweinepest und Schweineseuche. *Mitteilungen des Vereins deutscher Schweinezuchter.* 1908.

PLATE I.

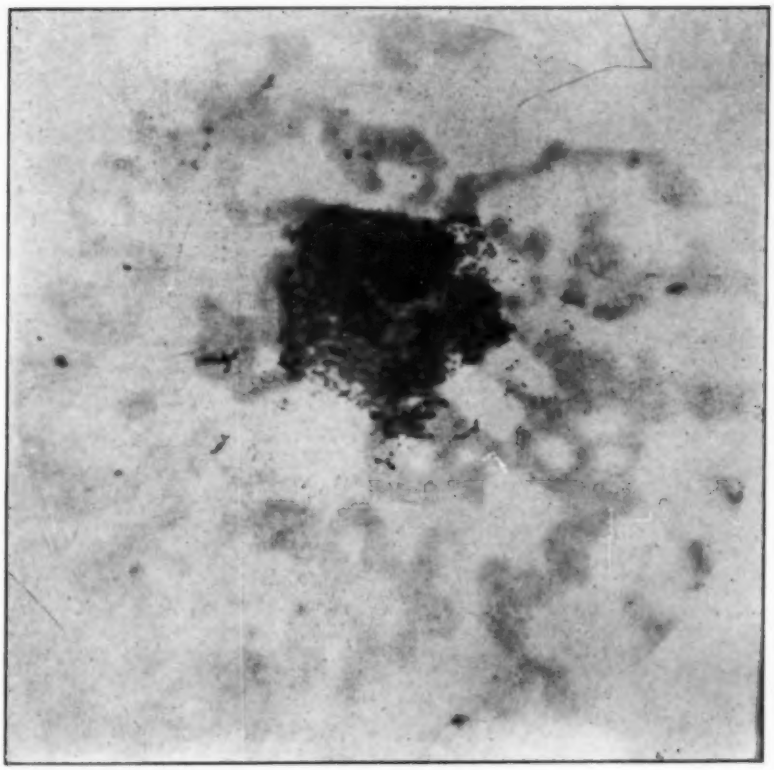


Figure. 1. Smear—Hog Cholera Blood—Endothelium Cell—showing diplococci also extracellular virus—Leitz 1/12 oil immersion—Ocular 2.

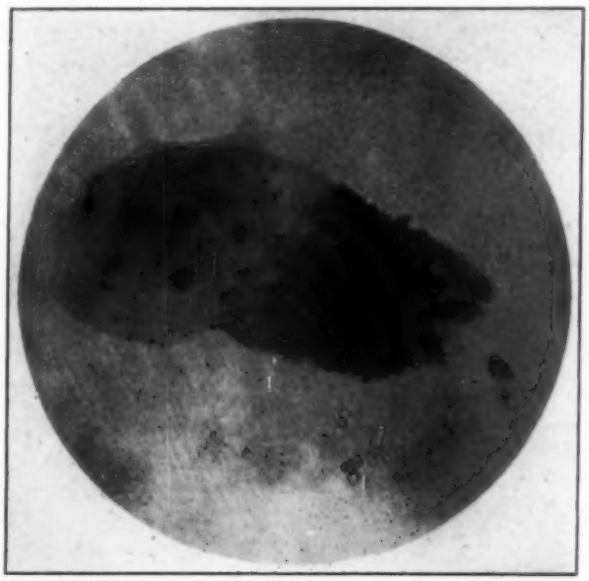


Figure 2. Smear—Hog Cholera Blood—Endothelium Cell showing diplococci, mitochondria and inclusions.
Leitz 1/12 oil immersion—Ocular 2.

Plate II.

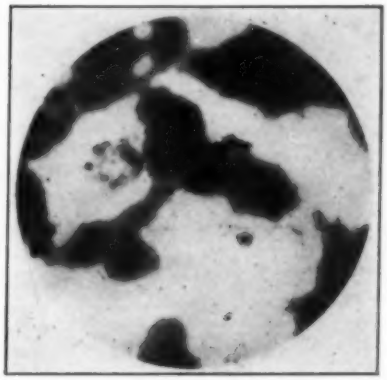


Figure 3. Smear—Hog Cholera Blood—showing microorganisms attached to red cells.
Leitz 1/12 oil immersion—Ocular 2.

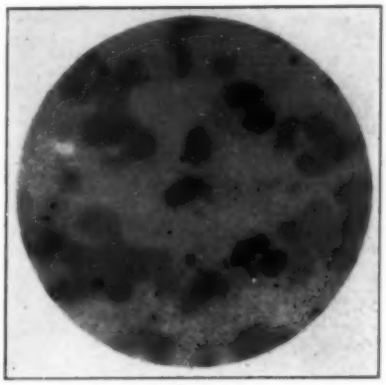


Figure 4. Smear—Hog Cholera Blood—showing microorganisms both in the protoplasm of a polynuclear leucocyte and also extracellular.
Leitz 1/12 oil immersion—Ocular 2.

Figure 5. Same as figure 4 but 4000 magnification.

(6) UHLENHUTH, HUBENER, XYLANDER UND BOHTZ. Untersuchungen über das Wesen und die Bekaupfung des Schweinepest. *Arbeiten aus dem kaiserlichen Gesundheitsamt.* Vol. 27, 1908.

(7) HUTYRA. Zur Aetiologie der Schweinepest und Schweineseuche. *Berliner tierarztliche Wochenschrift 32,* 1906.

(8) BOARD OF AGRICULTURE AND FISHERIES. *Annual Reports of Proceedings under The Diseases of Animals Acts, etc.* for the year 1903.

(9) THEILER. Die Schweinepest und Schweineseuche in Sudafrika. *Forstschritte der Veterinär Hygiene,* 6, 1906.

(10) V. BETEGH. Zur Ultrafiltration der filtrierbaren Virusarten. *Berliner tierärztliche Wochenschrift.*

(11) FLEXNER AND NOGUCHI. Experiments on the Cultivation of the Microorganisms Causing Epidemic Poliomyelitis. *Journal of Exp. Medicine,* Oct. 1, 1913.

(12) PROESCHER. Studies of Antiformin-resistant Microorganisms found in the Brains of Animals Infected with Rabies. *New York Medical Journal.* April 22, 1911.
Resistance of Street-virus to Antiformin. *Ibid* July 29th, 1911.
The Etiology of Rabies. *Ibid* January 4, 1913.
Die Aetiologie der Tollwut. *Berliner Klinische Wochenschrift* No. 14, 1913.
A contribution to the Etiologie of Poliomyelitis. *New York Medical Journal,* December 9th, 1910.
Poliomyelitis and Variola. *Ibid* April 12th, 1913.
Azurophile Microorganisms. *International Clinics,* Vol. IV, Series 23, 1913.
Foot-and-mouth Disease. *New York Medical Journal,* February 29, 1915.
The Artificial Cultivation of Variola Vaccine Virus. *Interstate Medical Journal,* Vol. 22.5, 1915.
Kunstliche Cultivirung des Variola Vaccine Virus. *Berliner Klinische Wochenschrift.* 34, 1915.

(13) BENDA. Die Mitochondria Farbung. *Verhandlungen der Anatomischen Gesellschaft Bonn,* Vol. 19. For further information on this subject, we refer the reader to E. J. Cowdrey. The general functional Significance of Mitochondria. *American Journal of Anatomy,* Vol. 19, 3. May 1913.

(14) PROESCHER. Aetiology des Fleck fiebers. *Berliner Klinische Wochenschrift.* 1915. 31.

(15) E. FRAENKEL. Zur Fleckfieberdiagnose. *Muenchener Med. Wochenschrift.* Pp. 805, 1915.

—At the twelfth annual meeting of the Ohio Valley Veterinary Association the following officers were elected: President, G. P. Isbel, Hopkinsville, Ky.; First Vice-President, C. F. McKinney, Vermilion, Ill.; Second Vice-President, John J. Fasser, Salem, Ill.; Third Vice-President, C. D. Bailey, St. Elmo, Ill.; Secretary, C. S. Henry, Terre Haute, Ind.; Treasurer, B. F. Stahl, Oblong, Ill. More than two hundred veterinarians were present and a very successful meeting was reported.

—Dr. J. J. Frey, formerly of Chicago, Ill., has removed to Sacramento, Calif.

THE ACTION AND CONTROL OF ANIMAL PARASITES WITH SPECIAL REFERENCE TO THE INTESTINAL CANAL*

R. P. LYMAN, East Lansing, Mich.

That the veterinarian is eminently a scientist, and because the study incident to attaining the mental and physical equipment sufficient to secure a doctor's degree in veterinary medicine, is widely recognized and generally admitted to be of a highly scientific character, has, the writer believes, as much as any other factor, aided in the rapid uplift and public appreciation of the obligations of our profession. We who have signed ourselves over (if I may so express it) to a life's work of controlling, eradicating and alleviating animal disease would fail miserably if satisfied to take the knowledge first gained and fail to keep up with advancements in scientific medicine or fail, further, to continuously re-equip ourselves to meet the ever increasing demands of the agricultural and commercial interests; no man can today be called an up-to-date veterinarian if he lacks the energy or is incapable of being stimulated to increase his store of knowledge and utility in his chosen field of effort.

Acknowledging our improved methods for handling animal diseases we must not lose sight of the fact that medicine (human or comparative) cannot even with our available information and marvellously improved laboratory facilities be adjudged an exact science and, consequently, the fact remains that many diseases to which animals fall heir, plagues if you so prefer to call them, and, indeed, the very conditions having the greatest economic importance, remain incurable or at least have such a high rate of mortality as to force us to direct attention along other channels than alleviation and cure if we would serve the best purposes. The source of relief recognized as most efficient is preventive or control medicine, based largely on the realization that health of one means health to others and for our present purposes I prefer to include diseases of parasitic origin as holding an equally important place with other common or communicable maladies of microbian or protozoan origin.

*Presented at the meeting of the Missouri Valley Veterinary Medical Association, St. Joseph, Mo., February, 1917.

In order to demonstrate veterinary responsibilities incident to agricultural progress let us view the question from three angles: the value of animals, protection afforded and annual toll from diseases, and do this by quoting a few figures compiled from federal sources. First: on January 1, 1917, the total valuation of 206,318,000 farm animals in the United States reached a sum in excess of $6,685,020,000; $664,350,000 more than for the year just preceding. Applying these figures to Missouri and thus make my references immediately applicable, if you will bear with me, I will offer further comparative data based upon livestock and veterinary estimates within this your own state. Missouri farms have approximately $300,301,000 invested in 9,485,000 animals, without reference to animals commercially employed, to poultry or pets.

Turning now to the second consideration: protection afforded through veterinary control. The last official estimate I have been able to secure indicated some 11,652 practicing veterinarians, or in other words taking the figures above quoted this means that each veterinarian has under his direct care something over 17,707 animals, not including pets and poultry, and responsibilities aggregating a valuation of $101,700.91. Observe if you will the responsibilities upon our profession and as far as statements indicate these figures refer to both licensed graduates and non-graduates. Using this comparison and turning to your own state we discover at last report 887 licensed practitioners, which means that in Missouri one veterinarian is a guardian of 10,693 animals, valued at $337,430. You will, I believe, admit the great responsibility upon the profession.

Third, the direct losses from various diseases in the United States for the year ending January 1, 1916, totaled, as near as can be estimated and it is probably low rather than excessive, the enormous sum of $222,850,000, divided among the various diseases and including something in excess of the conservative estimate of $15,000,000 from disturbances of known parasitic origin, without taking into account the indirect losses. Accepting the usual basis of a ten (10%) per cent loss (figures used by other states for a number of years) we can assume there is an annual sacrifice in each state of many millions of dollars due to animal disease that can be brought under combatable control and by so doing render untold value to agriculture.

If we would claim efficiency as students of veterinary medicine we must acknowledge the value of prophylaxis in combating animal disease and, moreover, as the morbid influence of parasites upon the animal economy does not materially differ from the results due to infectious diseases, there is apparently no valid reason why this phase of veterinary control should not receive attention equal at least to that given microbian contagion; indeed, are we not gradually coming to realize this as a necessity? Today our periodicals seldom appear without offering something referring to parasitology and its relation to animal disease. We will here only attempt to present this important subject through considering in a general discussion the actions of parasites and their control, hoping thus to intensify the interest of others in this field of veterinary science; not a new field but one until recently rather unappreciated as regards the direct effect of parasites upon the infested host, their economic importance in food values and, equally so, their direct and indirect opportunities for transmissibility of their influence to man. The influence upon the animal economy of parasitic invasion lacks uniformity even in different cases of infestation by parasites whose identity cannot be differentiated, as for example esophagostoma infestation; to some extent this can be directly attributed to the resistance of the host because, though not absent in well nourished individuals, parasites generally flourish in debilitated bodies. A host may be extensively infested without marked symptoms; the lesions produced may be only local, remain negative, or again an agency through which secondary disturbances arise by bacterial contamination of the injured region. In such instances the parasite has punctured the tissue through endeavoring to gain a stationary position because the visceral and circulatory movements make it otherwise impossible to feed or, again, the tissue abrasion is either the result of their manner of feeding or through local nutritive disturbances. The entire physique may be upset as is determined by diminished activity or listlessness; through impairment of the nutritive carrying power of blood, characterized by thinness, emaciation, later anemia and occasionally nervous disturbances. Symptoms of nervous derangement must not, however, be invariably attributed to such blood impairment for, unquestionably, the fits or convulsions discovered in young animals are quite frequently of purely functional nature, resulting from local nerve irritability and reflex influences. Equally so, the re-

searches of Weinberg would indicate that worms elaborate a hemotoxic substance from the region of the digestive tube which has successfully produced convulsive fits upon experimental animals. Elaboration of this substance undoubtedly has an influence in the general emaciation already referred to and to the diarrhea at times observed.

Parasites, worms especially, cause serious mechanical disturbance by obstructing or narrowing the lumen of the blood vessels, smaller respiratory tubes and intestinal canal; secondarily, this results respectively in arterial rupture with serious and occasionally fatal hemorrhage or in secondary embolic invasion of the body, in pulmonary occlusion and in inflammation of bowel or peritonitis where perforation follows the occlusion. The strongyli or sclerostome worms, of which we have more to say later, quite commonly cause aneurysmal dilatation of the arteries, particularly branches of the posterior aorta.

Lastly, we must not overlook the influence upon growth and development occasioned by their tendency to appropriate and extract nutrition and disturbances incident to a migratory tendency displayed by some, as for example ascaris enters the bile duct while others, through this influence, reach the same organ, the peritoneum, blood and other parts of the body.

The problem of adequate control of animal parasitism is staggering in its essential details but undoubtedly has for its foundation a knowledge of the life history of each parasite to be attacked. Probably no individual can competently equip himself with this information complete in every way and have it available for use at all times and for all forms of livestock infestation, but even so, he ought to have the subject well in hand through gaining familiarity with those indigenous to his respective locality; must know and learn how to control the source of reinfection; discover agents best adopted to stimulate the systemic resistance against invasion and, equally so, become conversant with means suitable for relieving infested animals, not failing to realize that carriers and their discharges are a constant menace to success in this effort and, likewise, have full realization that parasites of burrowing tendency are oftentimes inaccessible with the present available therapeutic agents. In a general way, though location must naturally influence our method of treatment, internal treatment, when inhalation is not indicated, resolves itself into emptying the stomach and

bowel and, following a twenty-four hour fast, administer the anthelmintic with or just previous to a laxative; following this medicine by nutritious, easily digested diet, good tonics and measures to avoid reinfection by attending especially to the manure that contaminates food and water. On places where parasitic infestation is or has long been indigenous the control measures, other than already considered, resolve themselves into repeated dosing of the young animals, this until their resistance is increased by age.

The main object of this paper is threefold: to present evidence to show that the enormous investments in livestock warrants measures tending toward relief or control of all phases of animal disease; second, that the problem of control of parasitism is too great to even assume to believe the practitioner can be an ever ready expert upon all matters relating to all forms of infestation and, third, to emphasize this latter statement by displaying details incident to a knowledge of a single species. Two parts of this thought have already been adequately considered, it now remains to demonstrate the third and for this is selected the palisade worm, *Strongylus armatus,* the most frequent parasite of the horse. According to Hutyra and Marek, Bollinger claimed "90 to 94 per cent, of all horses, with the exception of foals have a verminous aneurism." "More recent investigation, however, proves that the disease occurs in foals." Craig (Ireland) states: "During the past ten years I have found these worms in the anterior mesenteric artery in 80 per cent of all horses."

In 1901 Stickler discovered a difference of the mouth parts among worms previously grouped under the name *Strongylus armatus* and divided them into three forms. 1. *Strongylus equinus,* 2. *Sclerostomum vulgare* or *S. bidentatum* and 3. *Strongylus armatus* or *Sclerostomum edentatum.* M. Nevue Lemaire in his text "Parasitologie des Animaux Domestique" describes the worm as *Sclerostoma equinum* or *Strongylus armatus.*

Without dwelling further upon its nomenclature, this worm when mature is found in the cecum and colon where eggs are deposited and later expelled with the excrement. According to Lemaire from three to eight days following their expulsion they become highly resisting embryos or larvae that are subsequently ingested by the horse with contaminated food or water, reach the intestines unaltered and escape into the circulatory system where they produce the aneurysms upon the visceral portion of the pos-

terior aorta, particularly the nourishing arteries of the cecum. Later the parasite encysts itself in sub-mucous tissues of the intestine to pursue development, forming a nodule which presents a central orifice into the intestine through which the worm escapes when adult, thus may some of the nodules be found empty. Some are believed to develop entirely in the intestines, where mature worms firmly adhere to the mucosa.

The symptoms of this infestation depend largely upon location. When in the large intestines, even if numerous, they seldom cause trouble unless, at most evidences of an intestinal catarrh with wasting or more rarely a secondary disturbance directly attributed to toxemia and which occasionally results fatally, a condition to which our attention was called during the past month.

Circulatory obstruction is directly due to the irritating influence of the boring tendencies of the larva when attempting to adhere to the intima to thus avoid being flushed away in the blood stream; this irritation as already suggested continues on to inflammation and formation of a fibrinous deposit within the vessel. Incidental to the thrombus or aneurysm thus developed the tunic undergoes hypertrophy with calcareous infiltration of the deposit and secondary or embolic formations that, in turn, stimulate circulatory disturbances of varying intensity and characterized in the living subject by decreased velocity of the blood flow; by variation between the arterial and venous blood pressure and by anemia of the area formerly nourished by the diseased vessel. These three changes from the normal physiologic state of the circulatory system are instrumental in causing impaired nutrition, together with nerve irritability and is quite generally expressed by pain arising incident to convulsive intestinal contractions, — manifestations termed colic. That all animals infested with sclerostome larvae, where the pathologic changes are sufficient to produce symptoms of pain, do not invariably succumb to the disturbance, can be accounted for in the reestablishment of local nutrition, through anastomosing arteries within the excluded areas or, again, because the obstructed vessels subsequently dilate permitting enough blood supply to prevent tissue necrosis and the results coincident with permanent loss of peristalsis, viz: overdistention of the intestinal wall from accumulating ingesta, gas and extravasated blood. The thrombus is not always easy to discover upon post mortem examination, varying from a diameter not exceeding that of a pea, to large coagula, with free floating

prolongations, influencing dilatation and hypertrophy of the vessel into which they project from the parent mass. Most animals infested with mesenteric sclerostome larvae show loss of condition because the protracted disturbance causes chronic indigestion.

The symptomatology of this type of verminous, aneurysmal or thrombo-embolic colic lacks uniformity and cases observed vary on the one hand from mild periodic attacks of unaccountable colicky pains that disappear leaving a mysterious etiology, to, on the other, those that develop acutely into continuous painful manifestations terminating fatally after ineffectual relief efforts covering a period of from four to forty hours or, more rarely, longer. It is probably true, however, that genuine thrombo-embolic colic seldom has origin during rest but commences following work and because the increased activity of blood crowds the previously impaired vessels.

A description of the symptoms constitutes a résumé of the usual signs of so-called colic. Starting slowly or with early excruciating pain the animal is uneasily down and up, rolls or occasionally throws itself wildly about, assuming unnatural positions,—decubitus with all feet removed from the floor, a dog-sitting position, down on carpus region or stretched flat upon side. In acutely fatal cases the active symptoms of pain generally subside after an uninterrupted, rather protracted period of uneasiness, leaving the animal weakened, depressed and oftentimes in a semi-comatose state; this interval of quiet, anxiety and absence of expressed pain is later followed by signs of collapse, weak, running down pulse, muscular tremors, unsteady gait and, finally, with a convulsive effort, the animal falls apparently lapsing into a state of unconsciousness which only precedes death by a few moments. The protracted or subacute types live for four or more days but do not exhibit the severe signs of sensory and mental disturbance characterizing fulminating cases. Sweating varies but is not usually marked. Respirations increased as anxiety becomes more pronounced which later is determined by the altered expression about the eyes and dilated nostrils. The pulse at first squirty, indicating nothing other than the influence of pain upon the vasomotor system, soon shows increased frequency, is weaker and the vessels, prior to fatal termination, finally become dilated, toneless, with pulse almost imperceptible. Bloating is quite constant but lacks definite location, a fact the trocar and canula demonstrates without difficulty: moreover, if distention of walls

of the large intestine is eased by liberating the accumulated gas from within the colon or cecum, relief of pain is lacking. Abdominal auscultation reveals a primary increase but later, as gas accumulates, absence of the normal intestinal sounds, occasioned through interrupted peristalsis as is further evidenced by irregularity of defecation; protracted cases frequently show blood and mucus coated, constipated feces.

Rectal exploration here as with all forms of colic holds an important place in diagnosis. The pelvic flexure of the colon is distended, pushing back into the posterior abdomen and pelvis giving the rectum a crowded, contracted feeling: the distention extends anteriorly into the abdomen as the hand follows along the course of this organ. The cecum likewise when dilated extends more posteriorly than normal filling the pelvic cavity and lending an influence toward giving the rectum its crowded feeling during exploration; this organ is easily detected by the strong longitudinal bands. On the whole it may be stated that the abdominal distention, together with failure to discover further abnormalities on internal palpation, and the history of case without any evidence of dietary errors or exposure are factors that should cause one to suspect this disturbance, especially when these symptoms are unaccountably periodic or recurrent. Toxic cases may be rapidly fatal without showing any signs of pain but manifesting dullness, loss of appetite, paralysis, finally loss of consciousness and death leaving the nature of the malady in doubt without post mortem verification.

The therapeutic indications are two-fold: prophylactic and curative. The latter resolves itself into purely palliative measures and an anticipated high mortality. Recourse to the usual colic quieting preparations as chloral hydrate, ether, morphine or other anodynes for pain and peristaltic control measures; indeed the control of peristalsis is of prime importance to, if possible, prevent undue accumulation of ingesta about the paralyzed area and to offset the danger of torsion, displacement, etc., incident to the irregular movement of the involuntary muscles of the viscera. Because of these dangers the quick acting alkaloids as arecolin and eserin are physiologically contra-indicated. The great depression and nature of the disorder calls for general and circulatory stimulants and the trocar and canula will frequently serve a valuable palliative purpose but once used, however, it does not by any means free the bowel from future distention.

For intestinal sclerostomiasis the treatment employed for ascaris will suffice but relief is far more difficult owing to the tendency the parasite has of firmly fixing its head into the mucous membrane of the walls of the cecum. Repeated doses of turpentine are recommended by Lemaire for young animals to aid against the arterial complications and recently periodic administration of daily doses of five grains of atoxyl have been suggested for colts raised in infested places. As the embryo gains entrance into the system through ingestion of dirty, polluted water or contaminated pastures, care should be given to hygiene, recommending the use of filtered water on infested places, use of sulphate of iron sprinkled on pasture lands and control of feces of infested animals.

PERIODIC OPHTHALMIA*

R. F. AVERY, Montour, Ia.

Periodic ophthalmia, to the majority of us, is one of the most perplexing problems with which we have to contend in the practice of our profession. It not only presents difficulties in diagnosis, but also in prevention and treatment. It is not the purpose of this paper to try to set forth anything new on the subject but rather to bring about a discussion, if possible, by which we may all be benefited, and stimulate a little greater interest in the further study and observation of periodic ophthalmia.

The material for this paper has been gathered from men from various parts of the country as well as my own observations. All reports indicate an extreme prevalence of this disease during the past year as compared with previous years since nineteen hundred and eight. I have tried to sum these reports up as accurately as possible under diagnosis, cause, prevention and treatment.

To those who have seen periodic ophthalmia as our text books say it should occur, typical cases present very little difficulty in diagnosis. Atypical cases, of which we have a history of one or more previous attacks, are usually recognized from the history or from the changes that the eye has undergone. The prevalence of eye trouble, with its large percentage, proving under ordinary lines

*Presented at the meeting of the Iowa Veterinary Association, Ames, Ia., January 9–11, 1917.

of treatment to be periodic ophthalmia must lead us to look upon every case with suspicion, giving our prognosis and treating accordingly. Of cases presented for treatment, there has been everything from a mild conjunctivitis with photophobia to cases in which all the vessels of the eye and its integument were congested and the lids more or less swollen; with the anterior chamber of the eye containing a fibrino-purulent exudate with blood clots intermixed. The only cases where the eye alone is involved that we do not consider recurrent ophthalmia, are those with simple conjunctivitis without photophobia, or those in which the agent causing the irritation is plainly in evidence. Having then given to our client a probable diagnosis of periodic ophthalmia and usually a rather conservative answer as to whether the horse will lose its sight, we are met with a variety of questions as to whether other horses will get it from the one already affected, what causes it and how best to prevent it. The answers to these questions have done the majority of us more harm than the unsuccessful treatment of any number of cases of moon-blindness; because when we tell the majority of clients that it is moon-blindness they take it for granted that the patient already affected will go blind, but they do expect help in preventing its spread to other horses.

In the discussion of the cause we will not take in heredity, for it seems to be generally recognized that the breeding of horses so affected gives to their offspring a predisposition to the affection. We all probably have our own opinion as to what the actual cause is, but we are also ready to listen to any theory that sounds better than our own. An experiment that I had the privilege of conducting led to my own theory of its possible cause and how to prevent its spread. Three horses which were to be destroyed were used; one horse was affected with periodic ophthalmia and was undergoing the third attack. With a sterile syringe we withdrew a small quantity of the fluid contents of the anterior chamber of the eye affected; this material was then injected in equal amounts into the anterior chamber of one of the sound eyes of the other two horses. Horse No. 1 was placed in a poorly ventilated stall without light and one in which four horses had been known to go blind with periodic ophthalmia. The horse was fed and taken out to water twice daily; by the end of the tenth day the eye, into which the injection was made, showed it to be a typical parallel of other cases which had proven to be periodic ophthalmia. Horse No. 2 was

placed in a well lighted, well ventilated stall and allowed to run out a short time each day. At the end of the fourth day there was a slight cloudiness noticeable but this had disappeared by the tenth day; Unfortunately both horses were then destroyed; so we were unable to determine whether No. 1 would have been cleared up and had a recurrence or not. This, while it does not prove anything, led to the belief that there must be some primary cause with the exciting cause in the housing and surroundings. Basing our theory on the supposition that there was some definite factor which was communicated from one animal to another and that the surroundings were the exciting cause, a little further investigation showed that quite frequently in stables where two or more horses had been affected, they were horses worked in a team or standing in a stall together.

There were found to be several conditions which seemed to act as exciting causes. Three cases were found in horses that had been driven considerable distances facing a severe wind; all were presented the same day. Under varying forms of treatment these cases all proved to be periodic ophthalmia. Most cases were in horses stabled for considerable periods in semi or total darkness with poor ventilation. In two instances horses were brought in from pasture presenting typical symptoms of recurrent ophthalmia. One of these was found to have been playing across the fence with another horse almost blind in one eye. The other case had been by herself for two months and no cause of any kind could be determined. Dentition apparently has very little to do with this disease as there are as many mature horses affected as colts and young horses.

In stables where successively several animals had gone blind, it was possible to stop the condition by recommending a thorough cleaning and disinfection of the stalls and the installing of enough windows to properly light the interior. In most barns the windows were well distributed and were used for ventilation as well as for lighting.

The treatment, one that was recommended and used with varying results several years ago, seems to get favorable results in a reasonable number of cases. The method that we employ is the injection of compound solution of iodin into the extra-orbital adipose tissue. The amount injected depends on the severity of the attack but usually two drams are used. The syringe should have an inch

and a quarter needle and the land mark for the injection, the center of the depression just above the eye, the needle being directed downward and backward. Cases undergoing the first attack clear up in about two weeks and remain clear. There is some danger of unfavorable results where the horse is kept at work and the light not properly excluded from the affected eye. Horses treated during the second attack will not as a rule be affected again but will sometimes be left with a blue eye and prove to be the worst kind of shyers.

To sum up we may say that it is not possible to differentiate all primary attacks of periodic ophthalmia from other eye diseases and must, therefore, look upon all cases with suspicion. It may be largely prevented by sanitation and isolation of affected animals. Treatment is successful in the early stages and probably will not do harm in any case.

"'CONTAGIOUS ABORTION' INFECTIONS OF ANIMALS AND MAN"*

G. A. Roberts, North Carolina Experiment Station, Raleigh, N. C.

I am almost tempted to apologize for the selection of this subject, for having discussed it so frequently in my own State (N. C.) I would be compelled to do so there. However, I am quite sure that if there are a few of us over zealous concerning the extent and magnitude of results from such infections, the majority of veterinarians do not even yet begin to appreciate the full significance of such. Much of what has been previously said will therefore bear repeating. I have included mankind in the above title for the reason that I am likewise convinced that many have overlooked—purposely or otherwise—the fact that like results, as in animals, occur in mankind from similar specific infections. While what I have to say is largely applicable to horses, sheep and swine, it is with special reference to cattle. My excuse for presenting this subject is because of its vital economic importance.

Name: Like many, yea most of our diseases, the applied name or names are very inappropriate and a new one should be coined. We have selected the above for its "inclusiveness", wishing to indi-

*Read at the first annual meeting of the Southeastern States Veterinary Medical Association, December 27, 1916, Atlanta, Ga.

cate by it that as in several diseases, many "typhoid Marys" showing no visible signs of disease may go unrecognized, as well as to note the manifold different effects that may result from a single or dual infection.

PREVALENCE: It is perhaps impossible to state with any degree of accuracy, the extent of these infections, but suffice it to say that it is very general in this and other countries. Much more frequent, as above stated, than thought by most of those having made no special investigation as to its prevalence. There are few, if any, specific infections more general.

LOSSES: The losses, direct and indirect, are enormous, comparing favorably—or unfavorably—with cholera, tuberculosis, etc., if not heading the list, in gross losses among dairy cattle in particular.

PERSONAL OBSERVATIONS: My first acquaintance with positive cases of infectious abortions occurred some twenty years ago, but my first real experience with it was fifteen years ago in a pure-bred short horn herd in Missouri, where over ninety per cent of the pregnant cows aborted, with a loss of more than one hundred calves, within a few weeks' time.

Nearly fourteen years ago, I went to the A. & M. College at Raleigh, N. C., where we soon had enough abortions in the college dairy herd to designate them "contagious". The history of abortions in that herd has been very interesting, though many have observed like experiences. The first year we thoroughly cleaned up, disinfected, whitewashed and administered phenol in various ways. Much to our gratification the abortions soon ceased and few others occurred until the following spring. Again we treated as before, with like results. The third year, however, we were away at the time most of the abortions occurred and no special effort was made to control the trouble, but the abortions abruptly ceased in a like time as they had done both years before. Since that time, some years efforts were made as at first to control the abortions other years nothing was done with practically the same results during the years not treated as when treated. However, coincidentally or otherwise, fewer troubles have occurred since introducing few new purchases into the herd—though cotton-seed meal has been fed just as heavily.

ETIOLOGY: No doubt *B. abortus* in cattle plays a large part in producing the results attributed to this form of infection, yet I

shall not be surprised to learn some day that either dual infections are common or essential (as we are finding in many other diseases) or still other independent organisms are capable of producing some or all of such results. We readily admit that attributing any results, except a few abortions, to this infection is quite foreign to earlier conceptions, yet we are likewise frank to state that while there may be other causes than those associated with "contagious abortion" *per se*, the most satisfactory explanation to my mind, for the closely related troubles to contagious abortion, is that of infection.

AVENUES OF ENTRANCE: Little by little, additional information has been added to our knowledge concerning this infection and its varied results. I believe that Drs. Schroeder and Cotton have added another valuable link to our chain of knowledge in assuming from their investigations, that a frequent if not most common, mode of infection with *B. abortus* into an adult body is through the cow's teat.

RESIDENCE IN BODY: *Adult*: Schroeder and Cotton likewise found evidence to believe that the normal habitat of the *B. abortus* is only in the udder and the gravid uterus, the organism disappearing from the uterus shortly after parturition. That it is rarely ever found in males.

Fetus: In apparently normal calves from cows showing infected udders, the *B. abortus* was found in most of the viscera, the blood and subcutaneous extravasations of serum.

SYMPTOMS AND DIAGNOSIS: The symptoms or visible evidences of the infection are largely to be determined by observing some of the more grave possible results of the infection such as abortions, retained placentae, endometritis, many sterilities, nymphomania and possibly associated infections resulting in mammitis and calf troubles in the form of scours and pneumonia. While several of these features may coexist in the herd, one of them only is likely to be more predominant than the others, though at times they may be more or less equally prevalent. As with several other infections, some animals may show no visible clinical symptoms or lesions.

All cases of infection by the *B. abortus* cannot be detected by serological tests, however, a majority can be recognized by the agglutination or the complement fixation test.

ABORTION: Nature has made wonderful provision against any premature expulsion of the contents of a gravid uterus and

such does not occur unless under unusual circumstances. Those of us who have observed the rough handling especially of pregnant range animals, can appreciate the necessity for other factors than excitement and injury to cause such results.

Again, with the utter failure of so-called abortifacients as ergot, gossypium and pituitrin to produce abortions, we are naturally inclined to believe that the cases attributed to other drugs and many feeds are purely coincidental.

On the other hand, to us premature expulsions are satisfactorily explained on the basis of a uterine inflammation resulting from an infection or from a mechanical opening of the cervix simulating normal parturition.

RETAINED AFTER-BIRTH: Again, with the knowledge of the anatomy and physiology of the placentae, it is impossible for us to conceive of retentions other than from inflammations resulting from infection. If abortion has occurred before the fifth month, the villi will be very short and rudimentary hence little or no retention can occur. On the other hand, the most tenacious retentions can occur at full term, or overtime, with the greatest development of the villi and the greater amount of inflammatory products.

STERILITY: . Sterilities, temporary or permanent of the female, are due with few exceptions, to ovarian trouble or alterations of the mucous membranes, or their secretions, of the genital tract. Two conditions of the ovaries are quite common, often resulting in sterility, namely: the presence of a persistent corpus luteum and cystic degenerations. The normal function of the corpus luteum seems to be to inhibit ovulation and the persistent corpus luteum often effectively does so. The cystic ovary likewise apparently inhibits ovulation and often leads to nymphomania.

The alterations of the mucous membranes, or their secretions, cause destruction of the spermatozoa, prevent lodgment to a fertilized ovum or gives a very insecure attachment resulting in a very early unrecognized abortion, but not observed as such, would be suspected as sterility rather than early abortion. Here again, the theory of an infection offers a plausible explanation for most of such conditions.

In passing, I should like to remark that as Schroeder and Cotton seldom found *B. abortus* infection in males, likewise there is comparatively very little male sterility among animals—including stallions.

CONTROL AND TREATMENT: The control of the troubles resulting from such infections is to be sought largely in recognizing the infected animals by serological tests and the employment of hygienic and sanitary measures.

Treatment will depend largely upon the form of the disease resulting from the infection but most of the results will be beneficially modified by the measures applicable to treating of sterility. Most of the ovarian troubles, if not corrected by nature in time, will only be benefited through rectal and vaginal massaging of affected ovary, or in some cases, by single oophorectomy. Likewise, if nature does not correct the mucous membrane troubles, frequent mild irrigations by aid of instruments such as recommended by Dr. Williams should be resorted to.

CLINICAL AND CASE REPORTS

"Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and 'when dead it is decently buried in books'."

FORMALIN IN THE TREATMENT OF MASTITIS*

J. N. FROST, Ithaca, N. Y.

For our purpose we will divide mastitis into two groups particularly as to cause: first, mastitis caused by infection of various forms; second, mastitis due to other causes than infection. It is of the first group that we wish to speak.

In attempting to overcome the infection I had used the injection of boric acid solution, also oxygen gas without satisfactory results. I had tried the injection of equal parts of alcohol anl glycerin as recommended by Schmidt of Denmark. This likewise was not satisfactory and in some cases seemed to increase the infection.

In treating diseases of the respiratory and genito-urinary tract we use antiseptics which, given per mouth are eliminated through these tracts. Why then should we not treat infection of the udder in the same way?

In reporting for the committee on therapeutics at the 1914 meeting of the New York State Veterinary Medical Society, I re-

*Presented at the ninth annual Conference for Veterinarians, Ithaca, N. Y., January 15 and 16, 1917.

ported the good results obtained by feeding methylene blue in cases of mild infection of the udder. I also used methylene blue in combination with turpentine which is likewise eliminated through the milk.

At the 1913 meeting of the American Veterinary Medical Association, Dr. Klein gave a paper on "The Therapeutics of Parenchymatous Mastitis," in which he tells of using boric acid per mouth and finding it in the milk in twelve hours. He also speaks of using urotropin and finding formaldehyde in the milk in twenty-four hours.

At the conference last year Dr. Moak in speaking of streptococcic mastitis gave the impression that it was incurable but later in speaking with him I was unable to find any definite line of treatment which he had used. I had already cured some cases of streptococcic mastitis with turpentine and methyline blue but realized that something stronger was needed.

It was then I decided to try formalin and the results were so gratifying in the first case that I began a series of experiments with regard to elimination and dosage.

Quitman gives the dose for the cow as 15 to 30 minims and advises not to continue the use over too long a period as it is supposed to lessen or dry up the secretions from the gastric and intestinal glands and thus produce constipation or impaction.

With the idea of avoiding this we began the dosage at one dram three times a day and alternated with one ounce of turpentine twice daily. As this produced no bad effects we gradually increased the dosage until we believe the correct dose to be one ounce daily.

We have given 25 c.c. twice daily for two weeks and failed to see that it has produced bad effects in any way, either by loss of appetite, constipation or impaction. This cow at the time was being fed on dry hay and grain. We have also given 50 c.c. at one time without bad effect.

As to the method of administration we have given it undiluted in capsule. It may also be given in milk or oil. In combination with the latter we get the laxative effect of the oil which would be beneficial in treating mastitis.

ELIMINATION: In determining the length of time after giving formalin before it was excreted in the milk we used Leach's hydrochloric acid test for formalin. When one dram of formalin was given faint traces could be found in the milk in twenty-four

hours. When 25 c.c. of formalin was given three hours after water and seven hours after milking it was found in the milk two hours afterward and continued to be present for forty-eight hours. The largest amount was present from the eighteenth to the thirtieth hours.

We believe it advisable to supplement the formalin treatment with purgatives and diuretics as they increase the interchange of blood in the udder and hasten the elimination of waste products from the body. It is also well to use the suspensory bandage to relieve the weight and tension on the tissues. Then by placing cotton inside the bandage and keeping it hot by applying water the pain in the udder is materially reduced. When left for the night the wet pack should be changed for a dry one to prevent the chilling of the udder. In hot weather cold water may be used in place of hot with equally good results.

In our work with formalin we have not used the above methods except in two cases where the animal was necessarily changed from ensilage to dry hay and in these cases salts were given to relieve any constipation which might result.

In giving the results of our work with formalin, we give one from each of the different forms with which we have been experimenting.

Case 1. Cow had calved eight months previously and was pregnant about four months. For the past two weeks she had given thick milk and the two posterior quarters were hard and firm. Cultures made from the milk of this cow were sterile from the fore-quarters and from the hind quarters showed a pure growth of streptococci. The animal had been treated with home remedies and cow relief.

Gave one-half ounce of formalin and then followed by one dram dose three times daily alternated with one ounce of turpentine twice daily. Eight days later the treatment was discontinued and on the ninth day cultures from the milk of all quarters were sterile. Five months later, after the cow had again freshened the cultures were again sterile and the animal averaged over one hundred pounds of milk daily for forty days.

Case II. Cow had calved about four months previously and had been giving thick milk for five days. Cultures from the milk gave pure growth of streptococci from one quarter, mixed growth from another, a pure growth of micrococci from the third and a

sterile culture from the fourth. Gave one-half ounce formalin followed by one dram three times daily for five days. Cultures made from the milk on the ninth day were sterile.

CASE III. Cow had freshened four days before and had retained placenta. Was giving bloody milk from two posterior quarters. Cultures showed *B. coli* and micrococci. Gave twenty-five c.c. of formalin and repeated for three days. On the sixth day the milk was normal.

CASE IV. About one year ago cow had shown a small swelling at base of teat. Two weeks previous to our treatment the swelling had suddenly increased in size and at time of treatment was about three inches in diameter. The swelling was punctured with a hypodermic needle and a thin straw-colored fluid escaped. Cultures from this revealed pure growth of streptococci. Cultures from the milk of that quarter showed no growth. The abscess was opened and packed with iodoform gauze; the wound covered with sterile gauze held in place by adhesive tape. The second day after the abscess was opened the milk from that quarter became thick. Cultures from that quarter showed streptococci which had undoubtedly passed up the milk canal. Gave twenty-five c.c. of formalin and on the third day the milk was normal to all appearances but no cultures were made. Ten days later the milk became thick and cultures showed a growth of streptococci. This time twenty-five c.c. was continued daily for three days and on the fifth day the milk appeared normal and cultures were sterile.

CASE V. Cow had been milking hard for a few days and the trouble was gradually increasing. A small amount of exudate was found on end of teat forming a scab. After removing the exudate the external orifice was found to be normal. Further examination showed a small swelling in the teat canal, at the upper end, which was producing stenosis of the teat and causing hard milking. Cultures from the milk of this quarter showed micrococci and *B. coli*. Gave twenty-five c.c. of formalin and repeated in twenty-four hours. Also painted the base of the teat with tr. iodin and had the exudate on the end of the teat softened with warm antiseptic solution before each milking. Four days after the owner reported that the exudate had stopped forming and the milk was flowing more easily. Two weeks later he reported the cow milking very well.

Much credit is due Dr. Pickens for making and examining the cultures and also to Dr. Hayden for testing the milk for formalin.

FORAGE POISONING*

CHARLES THOMPSON FAKE, Granville, N. Y.

The above heading I believe to be very similar to our much abused term "colic", in that it is commonly used to cover a multitude of evils. Certainly it has received a number of designations, among which the principal ones are blind staggers, sleepy staggers, food poisoning, mould poisoning, cerebritis, epizootic cerebrospinal meningitis, epizootic encephalo-myelitis, leuko-encephalitis, and according to Hutyra and Marek in their last edition, enzootic meningo-encephalomyelitis, or Borna's disease. I, however, shall confine myself to the name forage poisoning, for while this term has its limitations there seems to be little data on which to base any absolute name.

HISTORICAL. Diseases of this character appeared in the old country in 1813: in America it was probably first noted by Large in 1847 and by Liautard in 1867. It has prevailed enzootically in various parts of the United States for the past twenty-five years, the most extensive losses having been in the west and southwest The outbreak in Kansas in 1912 was the most extensive yet experienced.

OCCURRENCE. Forage poisoning generally follows abnormal climatic conditions which tend to cause rank or quick growth of roughages. The disease appears in sporadic, enzootic or epizootic form, mostly in the fall and winter months, being most prevalent following seasons of heavy rainfall.

ETIOLOGY. Hutyra and Marek state that this disease is caused by infectious substances the nature of which is not known. With forage poisoning as with all other diseases of which we are not specifically sure, there are numerous causative agents named by as many different authorities. These agents embrace the micrococcus, diplococcus, streptococcus, while the filterable virus has also been accused. Our knowledge of bacteriology, while not to be compared with that of the gentlemen doing bacteriological work, is nevertheless sufficient for us to realize that bacteriological examinations might easily show the above mentioned organisms without proving their specific connection with the disease.

*Presented at the meeting of the Vermont Veterinary Medical Association, January, 1917.

Diseased animals have been associated with healthy ones, watered at the same tub, and fed from the same box without contracting the disease. However, different feed was given and the animals thus exposed when subjected to the same roughage for a period of three weeks contracted the disease. The statement made above is based on experimental work carried on during the Kansas outbreak, but does not point to a contagious nature of the disease. I believe forage poisoning to be due to a slow developing toxemia generated from the roughage. This statement to apply only to the cases I shall cite hereafter from my practice.

Susceptibility. Horses mostly are affected, less frequently mules, but the condition is sometimes observed in cattle, sheep and hogs. Age, sex, etc., have no apparent influence on the susceptibility, although Hutyra and Marek state three to seven years to be the most susceptible age.

Symptoms. Disturbance of central nervous system, staggering gait, closing of eyes, etc., excitability may be present. Congested conjunctiva, paralysis of throat and tongue are also noted. The temperature varies with the case, the excitable cases carrying high temperatures, but the ones I believe I have had have all carried sub-normal temperatures, some as low as 96 degrees. The pulse varies with the course of the disease but unless excitable symptoms are present it is generally slow. Death generally occurs in from twelve hours to six or seven days. In the latter stages of the disease delirium is present in some cases while in others a deep comatose condition continues to the end.

Prognosis. Recoveries rarely exceed 5 per cent of infected animals. I have had twelve cases with eleven deaths, and the last case not reported.

Course. Forage poisoning may terminate in death in from ten to twelve hours, but as the disease progresses, the intensity of the symptoms diminish and the later part of the outbreak may have cases extending over several days with some recoveries.

Lesions. Early cases that expire inside of twenty-four hours show practically no microscopic lesions considering the intensity of the symptoms. Secondary lesions in cases of long duration are noted. Pharyngeal and laryngeal infiltration, muco-purulent discharges from eyes and nose and enteritis may be present.

Microscopic lesions are confined to the central nervous system, there being round cell infiltration around the blood vessels of gray

and white matter in the cord. Degeneration of motor cell centers is also noted.

DIAGNOSIS. Microscopical examinations are sometimes necessary to differentiate this disease from other diseases of the nervous system. It is not easily differentiated unless specific examinations can be made microscopically.

TREATMENT. I have found no record of successful treatment. One author says it is almost hopeless, and another that medicinal agents have proven of little value.

CASE REPORTS. Dec. 1st. Farm of Merrit Barden, West Pawlet, Vt., first animal taken Nov. 30th, died same evening. No veterinarian called. Second animal showed symptoms night of Nov. 30th: I saw case next morning. Called trouble forage poisoning: administered purgatives, and left strychnine to be given every two hours. Animal died next morning. Two other animals in same stable showed symptoms during day or evening of 1st of December. Third animal died December 6th, after showing nasal discharge and purulent discharge from eyes. Third animal taken at time of second seemed to be better for a time but did not eat and after a few days was taken worse and died on December 12th. This animal showed pronounced nasal discharge and great congestion of visible mucous membranes. The animals above that were treated by me all had sub-normal temperatures, and at no time did I find any fever.

Dec. 2nd. Farm of Jas. Montieth, North Hebron, N. Y., call came in A. M. Found two animals down. Both had been used day previous and had appeared normal. Subnormal temperature present in both cases and paralysis of hind parts very pronounced. Urine normal in appearance, pulse slow: indications of pain very slight. One of the above animals was dead the next morning: the other lived two days and developed discharges mentioned in the other cases. Third animal on this farm taken on morning of 4th of December, the case was more prolonged but the animal died on the 10th of December. There was a fourth animal in this stable that did not contract the disease. Was getting a different grain ration and was a light hay eater.

Dec. 9th. A bay gelding the property of a butcher at West Pawlet, Vt. Worked the day before and found down in the morning. Symptoms same as other cases. Died evening of 9th and was

posted by Dr. Rich and myself on December 10th. Post-mortem changes had taken place and our findings were of no help to us. Another horse in this stable received same rations and has never been sick.

Dec. 18th. A bay mare, quite old, property of Hungarian at Wells, Vt., presented the same symptoms above described. I was called late in the afternoon, animal having been down all day. Advised owner that animal would probably die before morning. Death occurred at 3 A. M. on the 19th.

Dec. 20th. Grey gelding, property of farmer at West Granville, was used day before; found down morning of 20th; died at 7 A. M. morning of 21st. Symptoms same as before described.

Jan. 16th. Called in afternoon to see animal that was found down in middle of forenoon. Found usual symptoms. Coma became heavier toward night and the animal died the next day. This animal belonged to a farmer that was doing thrashing at different farms and the grain ration was varied.

Jan. 20th. Sorrel gelding, property of farmer of West Hebron. This animal showed staggering symptoms, sub-normal temperature, slow pulse, would take a mouth full of hay and allow it to hang from the mouth. Symptoms not as intense as in previous cases. Animal had received hay ration entirely, no grain having been fed for two months. I have heard nothing further from this case since I made my call. The horse was given heavy purgatives, and stimulants advised. To date, Jan. 23rd, nothing further has been received regarding the case.

The above brief and incomplete data cover twelve cases, eleven of which have died: the majority within twenty-four hours after symptoms were noted. All the animals above mentioned were receiving all the hay they could eat. Part of them had had second growth, and two at least were tied to the hay mow where they took all they cared for. The grain ration of the first eight animals to die came from the same mill and was supposed to be western produced grain.

PREVENTION AND TREATMENT OF HEMORRHAGIC SEPTICEMIA OF CATTLE BY THE USE OF BACTERIAL VACCINE MADE FROM THE CAUSATIVE AGENT

T. O. BRANDENBURG, Lakota, N. Dak.

Autumn of 1916. Seventy head of cattle shipped into the State of North Dakota and placed with native cattle.

Three were dead when we were called, all dying with a pleuropneumonia. Sixteen showed well pronounced symptoms and carried a temperature ranging from 103.5° to 106.5°. Catarrhal and pectoral forms and only a few showing slight edema.

Administered 2 c.c. of vaccine hypodermically, 2,000,000,000. to each c.c. All showed improvement in a few days.

After 12 days, three developed the intestinal form of the disease and died.

A few weeks later 35 more were added to the herd from the yards and soon began to show symptoms of the disease.

Administered 1 c.c. to all and only one died which was well advanced at time injection was made.

I consider the vaccine an absolute preventive if properly used and curative in all cases which are not advanced.

Our experience shows that in order to establish a positive protection two injections are necessary about eight days apart.

We found the younger animals to be more susceptible to the disease and also to the treatment. The older animals developed the disease, apparently, more slowly but responded slowly to the treatment.

All deaths after vaccination were in old animals.

CHLORINATED LIME IN PRACTICE*

N. A. KIPPEN, Independence, Ia.

Chlorinated lime has been used for over a century as a bleaching powder, a deodorizer, disinfectant and parasiticide, due to the free chlorine gas that is so readily evolved, but has never come into general use until Dr. H. D. Dakin of the Rockefeller Institute,

*Presented at the meeting of the Iowa Veterinary Association, Ames, Ia., January 9–11, 1917.

after various experiments, has so subdued chlorinated lime as to make a neutral solution. As at first prepared it was made with sodium carbonate and boric acid; this was later modified and now the boric acid is eliminated altogether. The modified Dakin's fluid as made at the present time is as follows: (taken from the *American Medical Journal,* December 9, 1916,) take 200 grams of chlorinated lime (.25% active chlorine gas) 100 grams of anhydrous sodium carb., 80 grams sodium bicarb. Place the 200 grams of chlorinated lime in a 12 liter jar with 5 liters of water; shake the whole thoroughly two or three times and set aside over night. In another jar, dissolve the sodium carb.and bicarb in 5 liters of cold water and pour the contents of this jar at one gush into the jar containing the maceration of chlorinated lime, agitate the whole vigorously for one minute and then set aside for the carbonate to settle. After one-half hour the clear fluid is siphoned off and filtered through two layers of paper, the liquid thus obtained is then ready for use. It should be kept in a cool place away from the light. It will retain its potency for about two weeks. A suppurating wound, moistened with this solution every two hours, (care being taken that the fluid comes in contact with every part of the wound) is said to be sterilized in about 40 hours after which healing promptly takes place. Dr. Carrel is making use of this liquid in the American hospital in France; the British are using a modification of this formula which in my opinion is more suited to veterinary practice. This compound is made up of equal parts of chlorinated lime and boric acid mixed together and kept in an air tight container, for shallow wounds. The mixture can be dusted into the wound where the chlorine gas is set free and sterilizes the parts; or a solution can be made by dissolving 25 grams of the mixture in a liter of sterile water. After being allowed to stand for one hour, the clear fluid is siphoned off and is ready for use.

PRODUCTIVE INFLAMMATION OF THE FOWL DUE TO TRAUMA.

B. F. Kaupp, Pathologist, N. C. Experiment Station,
W. Raleigh, N. C.

History. A two year old hen. Breed, Mottled Houdan. This hen was a member of the station flock. The cock was a three year old bird and had suffered with a nervous affection in which his

movements were more or less stilty and difficult to perform. Several of the hens suffered trauma of the neck due to the beak of the cock during his efforts to copulate.

The specimen here studied is from a hen which apparently died from the results of the trauma.

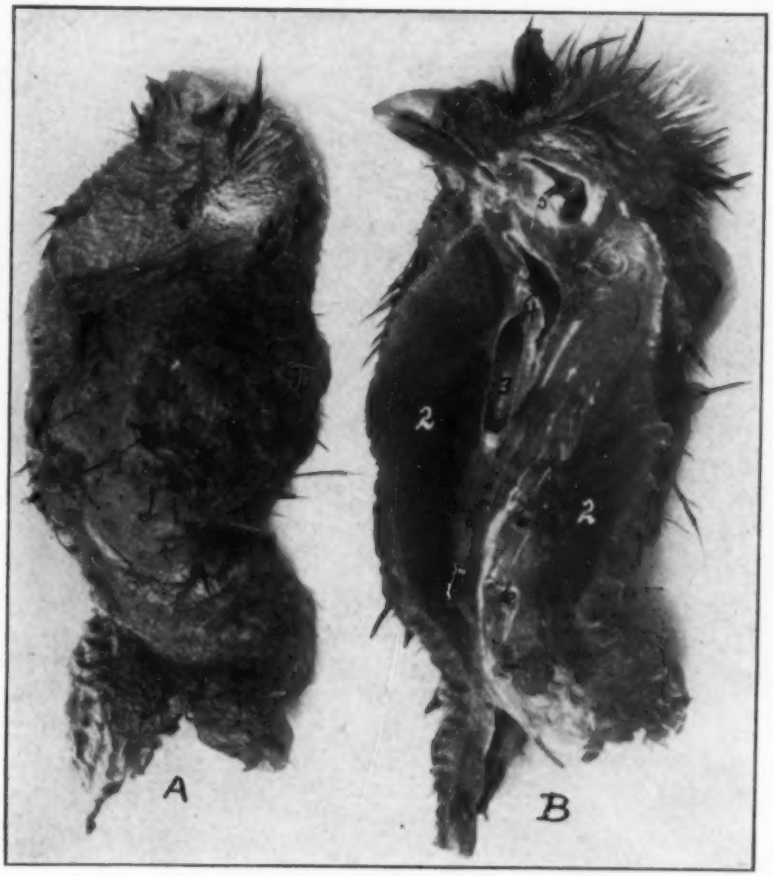


Fig. I.—Head and neck of a Mottled Houdan hen. Traumatic chronic inflammation. A, the outer surface of the neck; I, the wounds; B-2, the sectioned surface; 3, open trachea; 4, pharynx; 5, open eye orbit; 6, vertebral segments.

PROTOCOL. The feathers were plucked from the carcass. The body was in a fair condition of flesh and appeared normal except the neck. The neck appeared enlarged throughout the entire cervical region. The surface was irregular in outline. There was

evidence of healing wounds as shown at number I A, Figure No.I. Letter B, number 2 shows the sectioned surface of the neck.

Microscopic Study. The areas near the surface trauma show, on the surface, a zone of embryonic cells, then fibroblasts and finally newly formed connective tissue. There is little evidence of hemorrhage though a few zones are found containing fibrin. My-

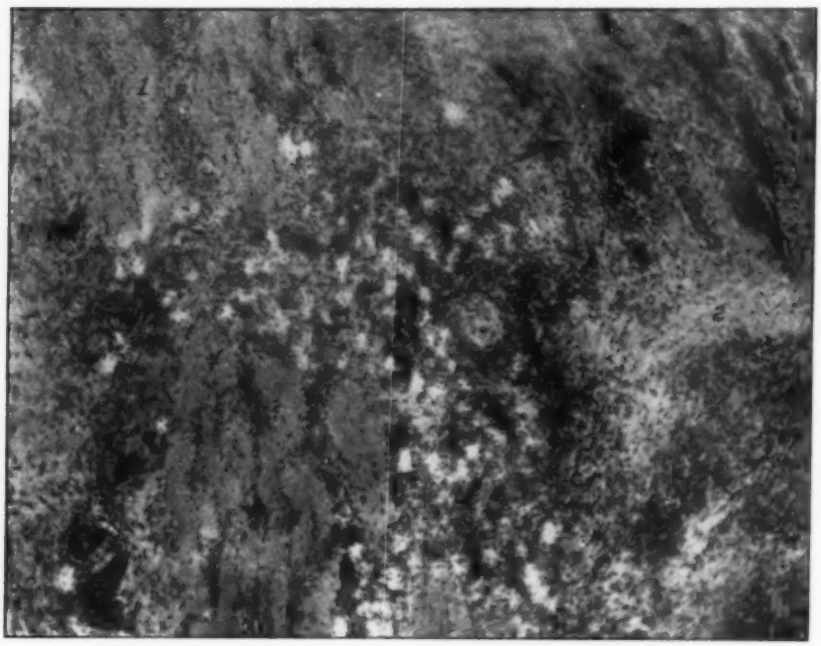


Fig. 2.—Photomicrograph of section through one of the areas at Fig. I-A. No. I, muscle fibres infiltrated with polymorphonuclear leucocytes and round cells. 2, an area of newly formed connective tissue. Many fibroblasts are still present.

riads of capillaries are found in the densely packed cellular areas. The musculature is infiltrated with cells both of a round type and polymorphonuclear variety. There is a pronounced myositis and a generalized productive inflammation.

DOUBLE FRACTURE OF THE PELVIS

DANIEL O'LOUGHLIN, Oneida, N. Y.

The specimen was a large brown gelding, 16 hands high, 6 years old, weighing about 1100 pounds and used as a race horse.

According to the history of the case, the owner was driving at a slow pace along an icy street; as he was passing a construction gang, who were repairing a canal feeder near by, the left hind foot of the horse slipped forward between the two front feet and continued in this position for a distance of about three yards. At this point he was leaning heavily on the left shaft and finally fell down. He made several strenuous efforts to get on his feet but was unable to do so. The harness and sulky were unfastened and we were called to the scene. A hasty examination was made, during which distinct crepitation of broken bones could be heard. He was very carefully moved from the street to the hospital. The owner was advised of the seriousness of the condition but was reluctant to have him destroyed on account of his value as a race horse.

He was raised to a standing position and placed in a narrow stall in slings. In this position intense pain and profuse sweating soon became apparent. He was able to bear weight on either hind leg when they were placed under him, but was unable to bear weight on both or to move either of his own accord. On moving the legs distinct crepitation of the bones in the pelvis could be heard. A rectal examination was made but very little could be discovered on account of the constant movements and uneasiness of the horse.

The symptoms became rapidly worse until he died in about an hour and a half.

The post-mortem examination revealed a complete fracture of the pelvis on both sides between the point of the ilium and coxo-femoral joint.

AN INTERESTING CASE IN COMPARATIVE MEDICINE

FRED W. PORTER, Tampa, Florida

On the evening of January 21, 1917 I was called by the owner, Mr. J. R. Fox to visit his captive Gorilla "Casey". On arrival I found a fully developed man sized ape whose weight was given me as 165 pounds. I was also told not to get within his reach, to which

I agreed. Under these conditions it was necessary for me to follow the lines of human medicine, i. e., look wise and ask questions. Inquiry developed the fact that I had been preceded in the case by a gentleman in human medicine and for the rest of the case we worked together. The creature was restless and was said to have shown a great deal of pain and that there had been no bowel action for four days. Urine had been recently voided. He would obey the voice of his owners, especially Mrs. Fox, for whom he showed marked affection. There was no opportunity for physical examination, palpation or any other method of close observation. To have gotten within his reach, for a stranger, would have been suicidal. With the help of his owners, we did get temperature per rectum and, using the human standard, it was within one degree of normal, later dropping to sub-normal. The diagnosis was fecal impaction and my suggestion was a high colon irrigation. As a starter, I had given him four times the human dose of an aloin cathartic, followed by frequent tablespoonful doses of refined oil, (hydro-carbon). This carried him through the night and the following day but showed no improvement. During this day (Monday, Jan. 22nd) the owner had some special harness made to confine the animal, so that a rectal injection could be made. Monday evening this was attempted in the following manner: Casey was already secured to his cage by a steel collar around his neck; a heavy chain from this collar to the cage bars. He would obey his owner's voice and by this means he was induced to lie down and his head chained fast, so that all he could do was to rotate the neck. A little more persuasive talking and the right hand was made fast at the wrist with a new, heavy strap and buckle; someone suggested that this might not be strong enough and a piece of new rope, one-fourth inch in diameter was placed as an extra precaution. Mr. Fox now went to the other side of the cage, to secure the left hand and arm. Just here Casey decided he did not want his right hand fast, so, with no apparent effort, he turned that hand over and there was no strap, rope or other fastening left. The owner's statement that I must not go near him, until he was secure, was not disputed by me at all. From now on, it was found utterly impossible to do anything with him, in the way of confinement.

Anesthesia was suggested, but Mr. Fox said that had been attempted on a former occasion, when some dental work was considered necessary. That at that time eight pounds of chloroform

had been used, with the cage closed up and the only effect was that Casey took the wads of saturated cotton and made a pillow of them. The animal died about midnight of Monday the 22nd in great agony. A post-mortem was asked for and consented to by the owner and the following conditions found: Peritoneum one-fourth to one-half inch thick, marked chronic inflammation. A quantity of purulent fluid was found in the abdominal cavity, great colon, both ascending and descending loops, empty. Numerous adhesions among coils of small intestine. Bladder normal and empty. Vermiform appendage entirely obliterated and the remains of an abscess found that must have held fully a pint of pus. Adjacent intestines, one mass of adhesions.

The condition was evidently one of long standing and had gone unobserved because the animal could not make his troubles known and would not stand for much familiarity even from Mr. Fox. He had done his usual performances up to a week of his death. Had been exhibited in New Orleans, put on board steamer and brought to Tampa and was first noticeably sick on arrival here.

This ape was an animal of very marked intelligence. He had no intelligible language, but he could and did make sounds that his owner understood meant certain things and he did understand what was said to him, regarding objects around him, even if these objects were new and unfamiliar. His age was given as 16 years.

—More Territory Freed from Tick Quarantine. The Federal tick quarantine was raised on March 1 from four counties in North and South Carolina. A total of 3,446 square miles is affected by this order. The counties freed are Duplin and Pender in North Carolina and Clarendon and Orangeburg in South Carolina.

These are the first areas to be released from quarantine in 1917. More than 42 per cent of the territory originally infested with the tick has now been freed from the pest and released from quarantine. Active work is planned for this year in every state in which the tick exists, and very considerable reductions in the quarantined area are expected in the course of the year.

—Dr. F. S. Schoenleber, for 12 years Dean of the Veterinary Department at the Kansas Agricultural College, Manhattan, has resigned. His plans for the future have not been announced.

ABSTRACTS FROM RECENT LITERATURE

INFLUENCE OF COLOR IN HORSES ON THE CURE OF MANGE. Masur. *Berliner Tierärztliche Wochenschrift,* 32nd Year, No. 24, p. 294, Berlin, June 22, 1916. Abst. in *International Review of the Science and Practice of Agriculture,* Year VII, No. 8, August 1916, p. 1128.—When treating numerous cases of mange, it was observed that the color of the horse has some influence on the cure of the disease. Cure was completed most rapidly in black horses, where often no formation of crusts even was observed. To cure them it was mostly sufficient to rub them with some ordinary remedy. In bay horses, cure required a greater length of time. In chestnut horses, the treatment had almost always to be repeated. In white horses, above all those with a uniform coat, treatment repeated a second time did not always bring about a cure, which observation was confirmed by other veterinary surgeons. These results were not affected, no matter what drug was resorted to for cure.

The writer is at a loss to explain exactly the cause of this phenomenon, but he thinks acarids enter more easily and more deeply into the skin containing no pigment and are thus more difficult to get at by the curative agent than in animals with pigment.

REICHEL.

CALCULUS IN THE KIDNEY OF A DOG. Country Veterinarian. *Veterinary Journal.*—A four year old retriever had difficulty in micturating. He was dull, slightly stiff behind in walking, his temperature was 103°F. Bowels were active and appetite good; he passed water without straining. Diuretics and small doses of a purgative were prescribed. The next day he seemed improved but the temperature was higher one degree. He had no passage of urine nor of feces during the day. He suffered no pain, breathed normally, the pulse was normal. From the floor of the abdomen, on each side, there was a fairly hard swelling. Oil, diuretics and enemas were prescribed. No effect was produced. Resin made into a soap bolus and four purging pills were ordered. Death followed during the night. In the abdomen there was a bloody colored fluid, the bladder had thickened walls and was a quarter full. It had a small aperture the size of a pin's head through which urine could be squeezed by pressure. Kidneys were enlarged, each contained a calculus, one about the size of a haricot bean and the other flat and rough on its surface. LIAUTARD.

FILIFORM DRAINAGE IN VETERINARY MEDICINE. P. Morel and V. Le Page. *Recueil de Médécine Vétérinaire,* Vol. 92, pp. 389-392, 1916.—The results obtained by Dr. H. Chaput with filiform drainage induced me to try this in veterinary medicine. The simplicity of the operation, etc. attracted my attention.

"Filiform drainage consists in favoring the escape of liquids coming out of wounds, abscesses, fistulas, and natural or pathological cavities, by means of threads of a varying nature and volume." (Chaput).

The author has used metal wires, silk, and rubber urethral bougies. Horse hairs taken from the tail were also used; these should be immersed for several hours in a strongly antiseptic solution before use. (permanganate or cresyl). Drains were used that went through the cavities. In order to pass the wires, openings were made with a bistouri, or more often, with iron needles, straight or curved. Each drain was composed of 4 to 10 horse hairs which were moved several times a day.

The treatment of several horses is described in detail; excellent results were obtained. The openings were small and painless, the cicatrices were pliable and not sensitive. Cold abscesses were treated with particularly good results. BERG.

JEAN BAPTISTE AUGUSTE CHAUVEAU. From *The Lancet,* No. III, of Vol. 1, 1917, No. 4873, Vol. CXCII, January 20, 1917, p. 121.—Auguste Chauveau, whose death in his ninetieth year we recorded last week, had outlived all his famous co-workers of earlier years. E. J. Marey had long predeceased him, while Charles Bouchard, his coadjutor in founding the *Journal de Physiologie et de Pathologie Générale,* died October, 1915. Associated thus in the direction of an influential journal, the spheres of activity of Bouchard and Chauveau were yet widely different: the former was an eminent and well-beloved physician, the latter will be remembered as a many-sided biologist and one of the makers and masters of physiology during the latter half of the last century. He was also a great comparative pathologist, doing pioneer work on various contagions, including tuberculosis, which had an intimate bearing on practical and preventive medicine. His energies, however, were not confined to this borderland between pathology and medicine, for he became a fine exponent of veterinary medicine.

Auguste Chauveau was born at Villeneuve-le-Guyard (Yonne)

on Nov. 23rd, 1827, and, like many other provincials, gravitated to Paris, where he studied at Alfort—the great veterinary school just outside Paris—and also in the Faculty of Medicine of Paris, as well as at the Veterinary School of Lyons. He was elected on the staff of the Lyons Veterinary School at the age of 21, and ultimately its director in 1875. His wide knowledge of the subject led to his appointment as inspector-general of the veterinary services in France. Later on his keen interest in the advancement of physiology and pathology found a new and wider sphere on his appointment as professor of comparative pathology at the Natural History Museum in Paris, where he built an entirely new institute for the study of comparative physiology and pathology. In Paris Chauveau took an active interest in all that went on in the medical societies. He was a member of the Institute at the Academy of Science, where he sat not as a physiologist but in the agricultural economy section, just as Pasteur did not sit as a chemist, but as a representative of mineralogy. He was also a member and regular attendant at the Academy of Medicine, as well as at the Society of Biology, of which he was at one time president. At these gatherings his genial presence and bonhomie, his interest in all newer scientific work, and also the younger workers themselves, made him a highly popular figure.

Chauveau's published writings cover a very extensive field. Some of the more important may be mentioned. In 1868 he published his "Nature des Virus", showing the "corpuscular state" of the virulent agents and the inactivity of the fluid in which they float. This was based on an earlier essay, entitled "Sur la Non-spontanéité des Maladies Virulentes." In the same year appeared a series of important studies on tuberculosis dealing with its virulence, the transmission by way of the digestive tract, and its contagious character in animals and man. Papers followed on the mechanism of natural contagion, on the attenuation of viruses and preventive inoculation, on the presence of pathological microbes in blood, in persons apparently in good health, on cow-pox and its relation to small-pox. Puerperal septicemia and gangrene were also studied. While still at Lyons he published his "Traité d'Anatomie Comparés des Animaux Domestiques," the second edition of which, revised and augmented by S. Arloing—at that time professor in Toulouse—was translated into English by the late Professor George Fleming and published in 1873. Bio-chemical prob-

lems also attracted him. He and his pupils did work on glycogenesis and on the formation and use of sugar in the organism. With Kaufmann in 1886 he attempted to solve the problem whether circulating sugar can be immediately utilized by active muscles. They came to the conclusion that an active muscle, such as the masseter of the horse, uses about three and a half times as much blood sugar as the corresponding resting muscle—results confirmed later by Quinquaud in 1886 and by Morat and Dufort in 1892.

It is, however, as the explorer of the movements of the living heart that Chauveau will probably be best remembered. As a contemporary of Ludwig and co-worker with Marey, his earliest researches were devoted to the study of the different phases of the cardiac cycle and the intracardiac pressure, the observations being made on the heart of a horse by means of the now classical cardiac sound of Chauveau and Marey, utilizing Marey's method of air-transmission of variations of pressure by means of tubes and recording tambours. Probably few of the younger physiologists in this country have seen such an experiment, but as recently as the International Congress of Physiologists at Liége Chauveau repeated this famous demonstration. The horse quietly munched its oats in the stable below, while the movements of its heart were recorded in the auditorium above. The main results of this work were published in a little brochure, entitled "Nouvelles Recherches Expérimentales sur les Mouvements et les Bruits Normales de Coeur," by Bailliére in 1856. Fuller details may be found in Marey's "La Circulation du Sang." In 1860 Chauveau constructed, with Lortet, the haemodromograph to measure the variations in the velocity of the blood in large arteries. Among other results they recorded the increase of velocity of the blood during systole of the left ventricle, and the increased rate of flow in the carotid artery during mastication.

Chauveau's personal characteristics made him widely known outside his immediate circle. He had a gracious and commanding presence. His massive, almost leonine, head, set on a powerful and strongly built body, made him a striking figure on public occasions. He was a great friend of the late Sir J. Burdon-Sanderson, and some of their work was done in the same region of physiology. Allusion has already been made to his catholicity of outlook and his encouragement of the work of younger investigators. Chauveau's long life was dedicated to the advancement of knowledge,

and his memory will live as truly in the work which his encouragement and inspiration produced at the hands of his pupils, as in his own many-sided achievements. REICHEL.

CONTRIBUTIONS ON OX WARBLES. (*Mitt. Ausschusses Bekämpf.* Dasselplage, 1912, Nos. 1, pp. 28; 2, pp. 16, pls. 4; 3, pp. 37, figs. 10; 4, pp. 26, fig. 1; 1913, No. 5, pp. 39, pls. 4, figs 2; 1914, No. 6, pp. 31). Abst. in *Exp. Sta. Record,* Vol. 35, No. 3, p. 282.—These several contributions relating to ox warbles are as follows: (1) Ox Warble Injury and the Removal of Ox Warbles, by R. Krause; (2) Ox Warble Flies, by H. Gläser; (3) Investigations of Hypoderma Larvae, by Peter; Ox Warble Removal, by Schöttler; and Warble Flies: The Egg and Oviposition of the Large Warble Fly (Hypoderma bovis), by H. Gläser, previously noted (E. S. R., 29, p. 761); (4) Warble Flies: Observations on the Life History of the Large Warble Fly (H. bovis) and Rearing Experiments, by H. Gläser, previously noted (E. S. R., 29, p. 761); (5) Warble Flies: New Investigations of the Life History of Both Ox Warble Flies, by H. Gläser; and (6) Warble Removal Experiments on the Neuhaus an-der Oste District in April, 1913 (pp. 3-16), and Warble Removal in Oldenburg in 1913 (pp. 17-25), by Schöttler and H. Gläser, and Experiments Which Show That the Warble Larvae Cause a Loss of Flesh of Cattle, by H. Gläser (pp. 26-31). M. J. HARKINS.

ON THE TREATMENT OF TETANUS IN HORSES. Major Veterinarians Poinsingnon and Dignac. *Revue Generale.*—This is the record of a case, which occurred in a mare after a deep punctured wound of the foot, and had been treated after the administration of an injection of anti-tetanic serum and by rectal injection of chloroform. The mare had been placed in slings. After nine days of treatment the tetanic symptoms subsided, but a complication took place in the left hind leg. This became the seat of such muscular atrophy, especially of the gluteals, triceps, cruralis and adductors of the thigh and of the leg, that soon the ilium itself became deformed and its external angle appeared to have dropped several millimeters lower than the one of the opposite side. All treatment of serum and chloral injections had been discontinued but the mare, not yet fully free from tetanic symptoms, was merely kept in slings until she was able to use her left

hind leg; then she was turned out to complete her convalescence. For the authors the use of slings is one of the essentials in the treatment of tetanus. LIAUTARD.

A CASE OF SEPTICEMIA IN MAN PRODUCED BY STREPTOCOCCUS EQUINUS IN THE ANGLO EGYPTIAN SUDAN. A. J. Chalmers, Director Welcome Tropical Research Labs. and George Haddad. *Journal of Tropical Medicine and Hygiene,* Vol. XVIII, No. 23, pp. 265-266, London, December 1, 1915. Abst. copied from *International Review of the Science and Practice of Agriculture,* Year VII, No. 2, Feb. 1916, p. 189.—A fatal case of Septicemia is recorded in a young Sudanese of 20 years, caused by *Streptococcus equinus* (described by Andrews and Horder in 1906). Probably the infection took place from horse dung through a wound. *S. equinus* was obtained in pure culture from the venous blood of the victim.

This is the first record of *S. equinus* pathogenic in man and of its occurrence in tropical countries. REICHEL.

A CASE OF ADENITIS IN THE HORSE WITH CEREBRAL LOCALIZATION. *Il Nuovo Ercolani.* Dr. Faville Frigino reports the following: a three year old army horse showed only manifestations of an over-worked organism and presented no signs of sickness. After a few days of observation he became very excited, uneasy, pushing his head against the objects before him. Once he fell down, and was bled and had cold applications to the head. These relieved him some, but the period of excitement was succeeded by one of quietness; he was almost comatose for several days. His condition then improved. This was followed by an abundant discharge from both nostrils which was treated with subcutaneous injections of antistreptococcic serum. Soon, however, another abscess came in the right parotid region and again another on the left maxillary. Finally one morning the horse was found down, unable to rise, with a pulse of 44, respiration 16 and rectal temperature of 38.2°. Paralysis was manifest and death soon occurred. At post-mortem, a cerebral mass was found injected, and under the left hemisphere there was a collection of pus contained in a pouch as big as a nut. The cerebral tissue was in normal condition. LIAUTARD.

AN EXPERIMENT IN HORSE PSYCHOLOGY. Vittorio Ricciarelli. An abstract from the Italian Journal "*Rivista di Psicologia*", Bollogna, 1914, No. 2.—Dr. Vittoria Ricciarelli, an Italian municipal

veterinarian, has been making an interesting experiment in horse psychology. He selected for his subject a colt of four months, not yet weaned, and began giving it systematic training. After twenty lessons of about twenty-five minutes each, the colt had learned to give a greeting by bowing its head; to extend, at its masters request, its right fore-hoof or its left hind-hoof; to distinguish by one, two or three strokes of its hoof, its fodder, its oats and its sugar; and to count up to ten by the same system. After the twentieth lesson the doctor taught it in six exercises to read the numerals from one to ten, which theretofore it knew by name only. The method of teaching was graded from the simple to the complex; and results were brought about through gentle and persevering means. There was no assistant at the experiments, and the colt was held by the bridle. When it had given an answer, it would try to free itself to go to eat oats; or it would come to smell the doctor's pockets in search of sugar; the hoped-for reward would, however, be withheld if the response was inaccurate, until an answer satisfactory to the master had been given.

Ricciarelli has been working on these experiments to this end—to try to discover if the cerebral activity of the horse is or is not susceptible of modification or development in the different stages of the animal's existence. It seems to him that, when we have demonstrated the existence or non-existence of this susceptibility, we shall have shown whether or not the equine psyche is analogous to that of the human being. That which distinguishes psychical activity from physical activity in the human species, is that, while the former is capable of essential metamorphoses, the latter is not. We find nothing in common between the psyche of the normal adult and that of primitive peoples, or that of the child who stammers automatically words of whose meaning he is ignorant; on the other hand, we have in common with both primitive races and with children, our manner of walking, of eating and of fulfilling all those physical functions, more or less unconscious and automatic, which have always remained the same in the human race.

Up to this time it has been supposed that the equine psyche, as also that of the other animals, bears the nature of a physical activity, since it has seemed—although it has never been proven—that the psyche of the oldest animals is exactly like that of the very young. If it could be clearly demonstrated, for example, that a young colt is capable of learning with equal facility what an adult

horse can and, vice versa, that an adult animal is not capable of more achievement than it was capable of in the early days of its life, the doctor would be willing to grant that the equine psychical phenomena are purely physical in nature. But if, as he is striving to prove, the contrary can be shown, we must admit that the phenomena observed are the manifestation of distinct intellectual possibilities, although of a grade far inferior to that of the human species. Such phenomena must become evident as the result of an artificial system of training, such as Ricciarelli is employing with his colt; this method may succeed in developing that energy which no evolutionary theory denies exists, at least in a latent state, in the higher animals. He purposes, therefore, to continue with his experiments on the colt up to the time when it shall have attained maturity at three and a half years, at which age its physical and psychical development may be judged to be complete. Then the doctor intends to mate him with a mare which has already been subjected, if possible, to the same training,—with the object of breeding, according to the laws of heredity, a race in which these phenomena have become heightened and accentuated. In this way he will be in a position to continue his experiments and collect a set of valuable data which may result in revolutionizing our preconceived notions of animal psychology. K. F. MEYER.

CENUROSIS IN A GAZELLE. Major Veterinarian Velu. *Revue Générale.*—A small gazelle was reported to the writer as having for a month past, a swelling on the right shoulder, causing lameness. The animal was examined and it was found that she was not actually lame, had no swelling on the shoulder, but a marked deviation of the neck which was turned toward the left. Careful consideration of the case and appearances indicated that she had cenurosis. A surgical interference was indicated but because of military service, could not be performed for some time. In the meantime the disease had progressed, an epileptiform crisis had occurred and there was between the base of the horns a small tumor, as big as a pigeon's egg, soft and easily reducible by pressure. It was the parasite cenurus, which after promoting the atrophy and then the resorption of the cranial wall, protruded under the skin.

While the animal was secured for operation, the right eye seemed slightly bulging from the orbit and was covered by an edematous swelling of the upper eye-lid. There was probably a

perforation of the cranium connecting with the orbit. The cenurus was extracted and measured a space 40 cubic centimeters. The animal died during the night from cerebral hemorrhage. The parasite had pressed upon the whole right cerebral hemisphere and the anterior part of the left. In the surrounding region the bony tissue had been the seat of extensive resorption. It was spongy, perforated by many holes, two of them, the largest, had opened into the bottom of the orbit. LIAUTARD.

OBSERVATION OF A CASE OF PULMONARY TUBERCULOSIS IN A CANADIAN HORSE. Bringard. *Recueil de Medécine Vétérinaire*, Vol. 92, pp. 213-215, 1916.—Horse 1920, 12 years, (named Dijonnais), arrived April 10, 1915, after a voyage which had greatly debilitated him. Entered the infirmary May 29, with strangles pneumonia (pneumonie gourmeuse), condition grave because the subject would not respond to treatment. There were numerous improvements and relapses.

Local irritants, tonics, febrifuges and diuretics postponed a fatal termination of the acute crisis, but the horse never completely recovered from his primary affection. He presented all the symptoms which are designated by old veterinarians under the name of "old founder" (vielle courbature) that is, a chronic affection of the lungs and pleura causing emaciation and general debility. The animal had regained appetite, but was in a state of continued fever, and manifested unmistakable signs of chronic bronchopneumonia, by accelerated respiration, fitful, weak and painful cough; marked weakening of the respiratory murmur, with bronchial and sibilant rales; diminished thoracic resonance and accentuated signs of dyspnea. The slightest exertion would wind the horse and rendered him useless.

There was progressive enfeeblement; skin dry and adherent to the ribs; mucous membranes became pale and edema appeared under the belly and inferior parts of the four limbs. Some time before death, urine became abundant; there was the polyuria that is ordinarily observed at the end of tuberculosis. Finally the subject succumbed in a state of complete physiological misery.

Since several cases of glanders were found in the lot of Canadians from which he came, we thought it possible that he was affected with that disease, and although there were no clinical symptoms apparent, the horse was malleinized three times, a month

apart. We used the intradermo-palpebral method, because the feverish condition prevented the use of the subcutaneous injection. All the tests were negative.

Autopsy.—The cadaver was in a state of very pronounced physiological misery. Traces of chronic founder on all four feet; the projecting parts of his body had been excoriated by prolonged decubitus. No nasal discharge, no traces of ulcers on the nasal septum. On skinning the subject we found the subcutaneous cellular tissue highly infiltrated and the muscles strongly emaciated.

Opening the thoracic cavity disclosed traces of an old pleuritis on the costal and pulmonary pleurae; in both lungs there were numerous chronic induration centers resulting from incompletely healed lobular pneumonia. This induration was particularly extensive in the anterior lobes; there was a multitude of tubercles, which were gray, homogeneous, without caseation centers or purulent disintegration. The mass of tubercles had the macroscopic appearance of the tubercles in bovine tuberculosis. On incising the large bronchial ganglia, there were numerous grayish yellow granulations, but no pus foci. Nothing significant in the other organs.

Inoculation tests on guinea pigs and bacteriological examinations excluded the bacillus of glanders BERG.

A CASE OF ANTHRAX. G. G. Reinle and R. A. Archibald. *The Journal of Infectious Diseases*, Vol. 19, No. 5, Nov., 1916.—Dr. L. A. Covel, a veterinarian, examined a cow that had died from anthrax. He developed the disease and 5 pustules appeared on his arm. Excision, which most authorities believe to be the best method of treatment, was not resorted to. Anti-anthrax serum appears to have played an important part in bringing about recovery. The lesions took on the characteristics of malignant pustules. They became less progressive after the first dose of serum. The fifth pustule appearing on the first day of treatment was arrested immediately. The patient's temperature curve reached a maximum of 103°F. 36 hours after dosage with the serum began and decrease as immunity and convalescence were established. Temperature was normal in about the 84th hour. Neither the anthrax bacillus nor any other infection showed in smears and cultures taken from secretions underneath the crusts on the 7th day after the serum treatment was begun. An eosinophilia ap-

peared with improvement in the patient's condition. The eosinophilia and its course through convalescence is unexplained. However, it is deemed worthy of special mention. HAYDEN.

HEMORRHAGE FROM THE SPLEEN. Capt. W. E. Armstrong, A.V.C. *Veterinary News.*—Two cases are reported by the author. In one, death took place after no precise symptoms. On post mortem, the spleen was noticed larger than normal and covered with numerous swellings of various size. Two were as big as a man's fist. The capsule of the spleen was ruptured at the base of the organ and blood escaped in the abdomen.

In the second case, there had been slight abdominal pains, temperature 102°F. Pulse 80 and weak, respiration jerky. Visible mucous membranes darker than normal. Pupils dilated. Abdomen very rigid. Expression anxious. Auscultation revealed slight peristalsis, percussion over the last four ribs caused pain. Rectal examination negative. As the case developed the symptoms were more marked; the legs were kept apart, ears and extremities grew cold, death after two hours of sickness. The spleen was found enlarged, and the capsule ruptured in two places at the base of the organ. The other organs were healthy.

LIAUTARD.

THE ACTION OF DIGITALIS IN PNEUMONIA. Alfred E. Cohn, M.D., and Ross A. Jamieson, M.D. (From the Hosp. of the Rockefeller Institute for Medical Research.) Abst. from *Jour. of Exp. Med.*, Vol. XXV, No. 1, Jan. 1, 1917, p. 65, 79, 80.—Digitalis has been used for many years in the treatment of pneumonia but there is still discussion as to whether its use is advantageous. A decision has been difficult because the difference between action as such and beneficial action has not been sharply drawn. We show in this paper that action on the heart by digitalis takes place in pneumonia, and also that its action under certain circumstances is beneficial.

SUMMARY: We have shown in a series of 105 cases of pneumonia, 95 of which we have selected as available for statistical study, that digitalis given by mouth has an action on the heart. We have judged this action to be present because changes occurred in the auriculo-ventricular conduction time and in the form of the T wave of the electro-cardiogram, just as they do in the non-feb-

rile heart. This conclusion is strengthened by finding that the pulse rate in fibrillating and fluttering cases fell in the presence of fever, exactly as it does in non-febrile cases. The dose and the time required to produce these effects are given and are the same as in the non-febrile cases. When there was a difference in the amount necessary to produce one or the other of the changes, it was found that the T wave is more often and more readily affected than the conduction interval. We have shown that the intoxication due to pneumonia is probably not responsible for the changes found, both from a study of the statistics and because in the control cases reverse tendencies were often found (that is, decrease in conduction time and increase in the size of the T wave). We have shown that the method of selection in consequence of which we treated a large number of severe cases did not prejudice our results, because it could be demonstrated that the proximity of death, whether in control or treated cases, was not necessarily associated with the changes we are describing. We have also, by referring to the literature of the subject, brought evidence to show that heart muscle does not undergo those changes in pneumonia, as it does in other infectious diseases, which would lead one to except changes in conduction found in other diseases. The changes in conduction which have been reported by others were almost entirely associated with the giving of digitalis.

CONCLUSIONS: 1. Digitalis acts during the febrile period of pneumonia.

2. It produces a beneficial, possibly a life-saving effect in cases of auricular irregularity (fibrillation and flutter).

3. Whatever beneficial action it has on the function of the normally beating non-febrile heart may be expected from its use in the febrile heart in pneumonia. REICHEL.

ANASARCA AND MALLEINATION. Major Veterinarian Bringard. *Bull. Soc. Cent.*—A Canadian mare having been brought to Breste in vessel where glanders had been reported was with several others malleined by the intradermo palpebral method. The next day she was reported as having given a typical reaction. In the injected eye, both eyelids were much swollen, there was an abundant discharge of purulent nature from the eye. The mare had also a yellowish bloody discharge from both nostrils. At first sight she was to be condemned, but on closer examination it was noted that on

the neck, and several parts of the body there were fluctuating tumors. There was also a rudimentary swelling of the lower extremity of the four legs and also around the lips and nostrils. The wings of the nose were thick and the septum nasi was covered with wounds which did not have the appearance of chancres of glanders. Some doubt was permissible as to the case being one of glanders or of anasarca. The mare was put under observation and received antistreptococcic serum; the swelling of the extremities increased, then the head; the breathing became difficult and during the development of this condition, the symptoms of the eye disappeared rapidly, and were all gone the following day. Nevertheless the mare was taken with colic and died. Post mortem: marked lesions of anasarca on the septum nasi, infiltration of subcutaneous tissue and of the muscles which were discolored. No lesions of glanders whatever. In the abdomen there was antemortem laceration of the great curvature of the stomach and obstruction of the small intestine due to a large invagination. There were no other lesions. LIAUTARD.

FRACTURE OF THE MANDIBLE OF THE INFERIOR MAXILLA. W. Cargill Patrick, F.R.C.V.S. *Veterinary News.*—Said to have worms, a three year old colt was brought to the writer who had no difficulty in finding that the trouble consisted in a fracture of the inferior maxilla across the body of the bone, behind the alveolar surface. On the lingual or superior surface of the same, a piece of bone projected upwards ¾ of an inch and prevented the animal from closing its mouth. One permanent and one temporary incisor were removed. The fracture extended through the primitive symphysis and the outer half of the body bore a separate fracture.

In order to attend the case, the colt was cast and in being chloroformed respiration ceased. After artificial respiration, drawing the tongue well forward, the animal came to and the operation resumed as follows: thorough cleansing of the parts, removing all loose bone and shreds of tissue, the separate fracture after being put into place, was drilled and sutured with wire, which afterwards, to give additional support, was twisted around the teeth. On the tenth day, the wire sutures were removed and recovery followed in due time. LIAUTARD.

ON THE ACETYLENE GAS TREATMENT IN RINGWORM, SARCOPTIC SYMBIOTIC, AND DERMATODECTIC MANGES. R. Stokoe. (*Vet. Rec.*, 28 (1915), No. 1433, pp. 279, 280). Abst. in *Exp. Sta. Record*, Vol. 35, No. 3, p. 279.—The author has found that powdered calcium carbid applied to the affected part (which has been moistened following a thorough scrubbing) and allowed to effervesce from a minute and a half, will destroy the ringworm parasite. Carbid can also be used with success in destroying mange parasites.

M. J. HARKNESS.

A CURIOUS CASE OF PERICARDITIS IN A HEIFER. M. Larroque. *Recueil de Médécine Vétérinaire.*—A short history of an animal which appeared well one morning and was found dead a few hours later. She had never manifested the slightest ailment. It was supposed that she had died from water indigestion or from a kick from a horse near her. Neither supposition was proved correct at the post mortem, where extensive lesions were discovered.

In the abdomen; the digestive canal was normal, acute nephritis and perinephritis, liver cardiac, iliac lymph glands hypertrophied and hemorrhagic. In the thorax, on the right side was a yellow mass surrounding the heart, acute pleuritis lesions, lungs normal but lymph glands hemorrhagic. The heart showed advanced exudative pericarditis, myocardium greyish, it contained a small abscess full of grey-greenish pus. Several abscesses were observed in the way of formation. The whole myocardium was in a state of degeneration; the endocardium also. The valves were thickened and had granulations on their edges; there was quite a large hole in one of the mitrals. The sigmoids were also macerated on their edges.

CONCLUSIONS: Everything indicated that the pericarditis was due to a foreign body having traveled from the rumen, and yet nothing was found to affirm the supposition. LIAUTARD.

—An annual meeting of veterinarians was held at Purdue University, Lafayette, Ind., February 27. Among those on the program were C. G. Starr, R. A. Whiting, M. H. Reynolds of Minnesota; W. E. Stone, President of Purdue; Ward Giltner of Michigan; and W. B. Craig of the Indiana Veterinary College.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

REPORT OF THE COMMITTEE ON DISEASES NONSPECIFIC TREATMENT OF INFECTIOUS DISEASES IN ANIMALS

K. F. MEYER

The treatment of infectious diseases with biologic products has, until recently, been guided by the well founded conception of an antigen-antibody reaction and by the current ideas of specificity. It has been only within the last two years that attention has been repeatedly called by clinicians to some facts which cannot be explained on this basis. Particularly the bacteriotherapy of typhoid fever in man strongly suggests that numerous unknown and nonspecific factors are responsible for some of the splendid abortive cures of this disease produced by the use of various kinds of vaccines. The importance of some of these observations for the further development of a successful treatment of some of the infectious diseases of animals is already quite apparent, and inasmuch as the writer had an opportunity to study, during the past year, some phases of the mechanism of this new field of immunology, a brief report in form of suggestions is herewith submitted to the Committee on Diseases.

The history of the nonspecific treatment of infectious disease: Aside from the well known results of vaccine therapy in subacute and chronic local infections of a character due to the micrococci, the chief field in which vaccine treatment has been very encouraging is to be found in the bacteriotherapy of typhoid fever in man.

During recent years various kinds of vaccines have been elaborated. The attempted goal of this etiologic treatment of acute infectious diseases has been to shorten the morbid process with its symptoms, to free the blood-stream from the causative organisms, to reduce the production of toxins, to prevent the formation of pathologic changes in the organs, or to heal those already produced; but these vaccines used subcutaneously have not, for the most part, given good results.

The slow action of vaccines by subcutaneous or intramuscular application or the frequent absence of curative effects lead to the

direct introduction of the bacterial antigens into the blood stream. A number of Argentine physicians (Penna, Torres, Dessy, Grapioli and Fossate[1]) reported striking pictures of complete abortion of typhoid fever in man following the intravenous injection of killed typhoid organisms or extracts of the same. The introduction of such vaccine preparations called forth, in a number of cases, hyperpyrexia prescribed by chills, cyanosis, collapse and respiratory distress, which was followed in a few hours by a critical fall of the febrile temperature curve to a normal level. The drop in temperature may be accompanied by profuse sweating and marked amelioration of the symptoms. In normal persons the intravenous injection of typhoid vaccine may give a reaction like that in typhoid fever, but ordinarily larger doses are required.

These observations have since been confirmed and have been in numerous directions enhanced. Gay and his co-workers[2], for example, have found that the temperature reaction is always followed by a more or less marked hyperleucocytosis, and Jobling and Petersen [3] noted a more or less marked mobilization of the serum ferments (protease and lipase) which, in their opinion combats the intoxication which may result from the liberation of toxic protein split products in the diseased organism. Other writers have suggested that, following the shock the organism passes into a condition of anti-anaphylaxis in which it ceases to react to the disease producing organism or its products.

The intravenous therapy attained a different aspect, however, when Kraus and Mazza[4] reported that colon-vaccine gave identical results, while typhoid vaccine was of a marked benefit in certain cases of pelvic infection. Furthermore, Ichikawa[5] and Gay[2] found, later, that paratyphoid patients recovered when treated with typhoid vaccine. The specificity of the treatment was made more questionable when Lüdke[6] attained favorable results by the simple use of a non-bacterial protein split product—a deutero-albumose, or, as Jobling[7] quite recently was able to show by the injection of secondary proteoses. Aside from these split products, observations

(1) See Kraus: Wien. Klin, Wchnschr. 1915, XXVIII, 29.
(2) Arch. Int. Med., 1916, XVII, 303.
(3) Jour. Exper. Med. 1915, XXII, 568, and Jour. A. M. A. 1915, LXV, 515.
(4) Deutsch. Med. Wchnschr., 1914, XL, 1556.
(5) Ztschr. f. Immunitatsforsch., 1914, XXIII, 32.
(6) Munch. Med. Wchnschr., 1915, XXVIII, 321.
(7) Jour. A. M. A., 1916, LXVI, 1753.

are recorded on the effect of salt solution, distilled water, homologous and heterologous sera, ferments, leucocytic extract, colloidal gold, etc., in the treatment of enteric fever. It seems probable that a number of substances when introduced intravenously are capable of causing a reaction of the tissues and that this reaction, in the majority of cases, is responsible for changes which lead to a recovery from the infection.

These early observations have in many cases been verified and confirmed. On a clinical basis the following facts are well founded: In about forty per cent. (40%) of the cases the recovery is abortive and a normal temperature is established in a few hours to a few days; in about twenty-five per cent. (25 %) a lysis with shortened course of the disease occurs. And only in thirty-four per cent. (34 %) does no reaction result, the course of the infection remaining uninfluenced. The mortality of the treated cases is reduced. Complications are rare and the chances for relapses are remarkably diminished. Acute as well as advanced cases are favorably influenced by the intravenous bacteriotherapy, and only severely complicated cases—particularly those with affections of the circulatory or respiratory systems should be excluded from the treatment.

Various workers have presented different views concerning the dangers of this form of therapy and, in the main, no one point of view may be regarded as conclusive. Doubtless the intravenous administration of vaccines is an heroic treatment and, according to many writers, is not justified in every instance. Until we know more about the nature of the shock the body has to sustain under this treatment, it is imperative that necessary care and proper judgment be exercised. And we are far from heralding the intravenous bacteriotherapy as the ultimate goal of the modern treatment of infectious diseases.

In other infections also, nonspecific products introduced intravenously may cause acute critical reactions, as colon vaccine in puerperal-sepsis, typhoid vaccines in pneumonia (Mathers and Wells: see Hektoen[8]), proteoses and typhoid vaccine in acute, subacute and chronic arthritic infections (Miller and Lusk[9]).

The nonspecific treatment of animal diseases: Thus far only one report by P. von Szily and T. von Bessko[10] on the bacterio-

(8) Jour. A. M. A., 1916, LXVI, 1591.
(9) Jour. A. M. A., 1916, LXVI, 1756.
(10) Berl. tierärzt. Wchnschr., 1915, XXI, 517.

therapy of contagious pleuro-pneumonia of horses indicates that the observations made with the nonspecific treatment of acute infectious diseases in human medicine can successfully be applied also to veterinary medicine. The two writers used ordinary typhoid or cholera vaccine in doses of 5–10 ccm., each ccm. containing 500 million organisms. In the fifteen cases reported, the intravenous injection of these vaccines caused most remarkable results. The temperature fell in every case, either critically or by lysis, and a marked improvement of the clinical symptoms followed. In every respect the observations resembled those made in typhoid fever. The findings of Szily and Bessko can only be the result of a nonspecific reaction because the specific etiologic agent of contagious pleuro-pneumonia of horses is as yet unknown and only human pathogenic microorganisms were used for the injections. So far, no confirmation of these splendid results has been made, but they clearly show that there is some experimental justification for the use of intravenous bacteriotherapy in other animal diseases.

In reviewing the present literature we find among the reports on the specific treatment of animal diseases the statement that informally better results are obtained when the homologous or heterologous sera are used intravenously: thus the treatment of anthrax and symptomatic anthrax with horse serum (Jaeger, Detre, Leclainche and Vallee and others). In the light of the recent advances these observations find additional explanation, and the use of colloidal metals like "collargol" in morbus maculosus and similar septicemias seems to have some justification.

The reports of successful cures of distemper with horse serum or nuclein, rinderpest with bile and contagious pleuro-pneumonia of horses with salvarsan intravenously, are all examples which never were explained and which were, therefore, soon discredited; but now we know that the beneficial effect may be the result of a reaction caused by the introduction of nonspecific substances into the blood stream. Fischer has shown definitely that salvarsan is only active on intravenous injection and that the chills and fever that occur for 3 to 9 hours are necessary to produce the desired effect. Other examples which point towards the existence of nonspecific treatment of animal diseases could be easily enumerated. Veterinary medicine offers splendid opportunities for experimentation in hog cholera, mastitides, puerperal septicemia, distemper of

dogs, shipping fever of horses, and so forth. With the exception of pregnant animals, the dangers are very slight and can easily be avoided because circulatory complications are less frequent and the selection of the proper dose is not as important as in man. These and other considerations prompted us to make use of the nonspecific treatment of a disease of dogs simulating distemper.

During the last year our experimental kennels were frequently infected with this malady and the extensive number of cases of this disease interfered considerably with the progress of the experimental work. Prophylactic immunization with dead and living vaccines of the *B. bronchisepticus* (the bacillus has, until recently been regularly isolated from the respiratory tract of the infected dogs) assisted only temporarily in combating the epidemic. Inasmuch as the question of the etiology of distemper and allied diseases of dogs is still unsettled, and inasmuch as we were not in a position to conduct carefully controlled experiments to determine the cause of this disease which clinically resembles distemper, we were forced to find a means by which we could shorten the course of the infection and reduce its mortality to a minimum.

The observation of v. Szily and Bessko suggested the use of the intravenous bacteriotherapy with typhoid or *B. bronchisepticus* vaccines. We have experimented with such products on more than twenty-five (25) dogs and have noted in a large percentage of cases very promising results. Some dogs were studied very carefully, and to illustrate the reactions, the subsequent amelioration of symptoms and the recovery, a few cases are presented in detail:

Dog 71: Fox terrier, male. Developed on December 7th, 1915, a slight nasal discharge, coughed frequently and showed a slight conjunctivitis. In the next eight days his appetite was very capricious, and on December 15th the animal refused to eat. For several days the stools were loose and sometimes mixed with traces of blood. The temperature fluctuated between 102.0° and 103.0°F. The pulse was accelerated, but strong. No consolidations could be found on auscultation. The blood count showed a marked polymorphonuclear leucocytosis. On December 10th, 1915, the animal was treated intravenously with 1 c.c. Army vaccine containing 500 million typhoid bacilli. The temperature and leucocytic reaction are shown in Table I. On December 20th the temperature had fallen to the normal level, the improvement was clinically well

marked. In less than ten days after the treatment, the recovery of the dog was complete.

Dog 76, which served as a control, showed the same clinical symptoms and temperature curve, emaciated rapidly and had to be sacrificed on January 5th in a moribund condition.

Dog 79: Yellow and white female cur. Showed on December 1st all the signs of acute distemper. With the exception of a very annoying cough the animal showed slight inappetence and a moderate fever.

On December 2nd the dog was injected intravenously with 1 c.c. of *B. bronchisepticus* vaccine (killed at 60 degrees, C.) containing 200 million organisms per c.c., the temperature and leucocytic reaction are shown in Table II. The recovery was very slow, but on December 5th the animal had reached a low temperature level; the general behavior and appetite were much improved, but the cough persisted for several weeks and only on December 29th was a complete recovery recorded.

Dog 83: This animal developed "distemper" about the same time and therefore served as a control. It died on December 22nd with lesions of extensive pneumonia and gastro-enteritis.

Dog 89: A small, black, male cur: on December 28th had all the clinical symptoms of "distemper", was, therefore, treated with *B. bronchisepticus* vaccine. The temperature and leucocytic response were very slight, there was a slight amelioration of the symptoms but the dog died twenty (20) days after the intravenous treatment with all the lesions of a bilateral bronchopneumonia and its complications.

Dog 91: Small, black mongrel, received in a very sick condition; subnormal temperature; profuse purulent nasal discharge; leucocyte count of 14,850. Was immediately treated, December 8th, 1915, with 1 c.c. of Army vaccine; there was a slight leucocytic response (32,200) and temperature excursion, but no amelioration of the symptoms. The dog died 30 days afterwards with the lesions of bronchopneumonia.

Dog 225: Small, yellow and white fox terrier, female. Suffered for about a week from a severe purulent rhinitis, diarrhea with large amount of blood, emaciation, and inappetence. Two days previous to the injection with vaccine, a bilateral parenchymatous keratitis developed. The temperature ran between 39.2° and 40.5°, the leucocytic count was 16,800. Pulse and respiration

were accelerated but no definite consolidation could be determined. Following the injection of 160 million typhoid organisms, a most striking improvement in the clinical symptoms became manifest. The temperature, after a critical rise, fell below normal, rose in the next 48 hours slightly, but remained on a normal level after another injection of 160 million organisms. The stools became solid in 56 hours and no blood could be detected. The animal ate heavily 24 hours after the first injection and continued to have a very good appetite. The general behaviour was changed, the animal was active and attentive; the keratitis cleared up in 48 hours. Recovery was manifest in about three days after the last injection.

Two normal dogs were injected with Army and *B. bronchisepticus* vaccine, respectively. The immediate effects were similar to those seen in the sick dogs: in one or two hours a rise in temperature which reached its height within three hours of injection. This elevation of temperature was accompanied by a leukopenia which was followed in 18 to 24 hours by a marked hyperleucocytosis. In both cases the animal vomited between the second and third hours after the injection. The reactions were very severe in both dogs, but were not followed by any ill effects. In some recent observations three other dogs injected with peptone solutions and vaccines, the reaction apparently favored the development of a rhinitis with loss of appetite. We are at present unable to explain this observation and are, therefore, contemplating a careful study of these conditions.

Discussion of the nonspecific treatment in dogs: The injection of heated, killed vaccines of the typhoid or bronchisepticus bacillus causes in sick and normal dogs a train of symptoms which is very characteristic and apparently due to the operation of the same forces which give rise to symptoms following similar treatment of man injected with the typhoid bacillus and of horses suffering from pleuropneumonia. In a large percentage of the sick dogs this reaction was followed by a striking improvement of the symptoms and by critical or lytic recovery. The results depend considerably on the dosage of the vaccines which provoke a severe reaction which is characterized by a temperature excursion, hyperleucocytosis and mobilization of ferments. No definite method of procedure can be described in treating a given case of "distemper": in some cases one injection will be sufficient to restore a dog to an essentially normal condition as judged from the clinical symptoms

and temperature chart. In other instances it is necessary to repeat the treatment 3 to 4 days later, particularly when the temperature fails to remain normal. The size of the dose and the frequency of injections must depend upon the symptoms following the first injection. In about 25% of our cases the intravenous treatment was absolutely without effect. Most of these cases failed to show a marked leucocytic response. The temperature was frequently influenced, but the morbid processes in the respiratory tract apparently continued and, in such cases, repeated injections aside from producing temporary effects were never provocative of an abortive cure. Several of our experimental dogs could probably have been saved by several injections, but it was in the interest of our study to observe only the immediate benefit of one injection. In this connection it became evident that dogs with bronchopneumonic foci and high leucocytosis are the least responsive, and in such instances the intravenous treatment only protracted the fatal outcome. In connection with some experiments on rabbits, we made the observation that severely intoxicated animals show a very slight change of serum proteins and a correspondingly slight increase in the immune substances of the blood. It appears that the profoundly intoxicated body is unable to respond by a marked reaction to the vaccines which are introduced intravenously.

In a few cases only did we consider it advisable to test the immune substances against the *B. bronchisepticus*. In most instances a decided increase of the agglutinines for the *B. bronchisepticus* was recorded even after the injection of typhoid-vaccine.

The observations are too few, however, to warrant any conclusions. We consider our attempts purely experimental studies, and it is hoped that a repetition of the intravenous treatment of dog distemper or allied conditions from the same viewpoints, be attempted.

CONCLUSIONS: The successful treatment of typhoid fever, arthritis, puerperal sepsis in man and contagious pleuropneumonia of horses by intravenous injection of nonspecific bacterial vaccines suggested the treatment of distemper or allied diseases in dogs. Some very encouraging results by treating dogs with typhoid or *B. bronchisepticus-vaccines* are described to encourage more elaborate studies along this new line of vaccine treatment.

It would be inappropriate to draw conclusions or to make recommendations before further carefully controlled observations have been made on some of the animal diseases for which this treatment is, perhaps, applicable.

TABLE I.

Dog 71 Date	Hour	Temperature	Leucocytes	Remarks
Dec. 16, 1915	10:00 A. M.	102.0°	24,900	
Dec. 16, 1915	10:10 A. M.	—	—	1 c.c. Army vaccine equals 500,000,000 typhoid bacilli intravenously.
Dec. 16. 1915	12:50 P. M.	105.4°	—	
Dec. 16, 1915	1:50 P. M.	106.3°	31,900	Very depressed, vomited, muscular tremors.
Dec. 16, 1915	4:00 P. M.	103.0°	35,600	
Dec. 16, 1915	5:50 P. M.	102.0°	—	
Dec. 17, 1915	10:00 A. M.	101.8°	29,600	
Dec. 17, 1915	4:00 P. M.	102.2°	—	
Dec. 18, 1915	6:00 P. M.	102.3°	—	
Dec. 20, 1915	6:00 P. M.	101.1°	22,300	
Dec. 25, 1915	—	101.3°	—	Dog has made complete recovery.

TABLE II.

Dog 79 Date	Hour	Temperature	Leucocytes	Remarks
Dec. 2, 1915	11:40 A. M.	102.4°	8,700	
Dec. 2. 1915	11:55 A. M.	—	—	200,000,000 *B. bronchiscpticus* killed by 60°C. and suspended in saline intravenously.
Dec. 2, 1915	1:50 P. M.	105.5°	—	
Dec. 2, 1915	3:45 P. M.	107.0°	8,100	Vomited at 1 P. M.
Dec. 2, 1915	6:00 P. M.	105.2°	—	
Dec. 2. 1915	10:05 P. M.	103.2°	29,900	
Dec. 3, 1915	10:00 A. M.	102.3°	21,800	
Dec. 3, 1915	6:00 P. M.	102.1°	24,700	
Dec. 4, 1915	12:00 P. M.	102.6°	15,000	Still coughs.
Dec. 5, 1915	6:00 P. M.	101.6°	—	
Dec. 6, 1915	—	101.6	—	
	—	102.2	—	
Dec. 20, 1915	—	101.3	—	Coughs rarely. Has diarrheic stools.
	—	100.0	—	Eats well and is picking up in general appearance
Dec. 29, 1915	—	—	—	Dog has made complete recovery.

AMERICAN VETERINARY MEDICAL ASSOCIATION REPORT OF THE ACCOUNTANT TO THE FINANCE COMMITTEE*

Dr. E. L. Quitman,
Chairman Finance Committee,
American Veterinary Medical Association.
Dear Sir:—

We have audited the records of the Treasurer of your association for the period August 1, 1915 to August 7, 1916 and have compared the results with the Treasurer's printed report and with the records of the Secretary, with the following results:

*The report of the Finance Committee of which this was to be a part has apparently been lost. The Editor has been unable to locate it.

We find that the Treasurer has duly charged himself with all funds transferred by the former Treasurer, George R. White, as well as all funds remitted by the Secretary representing, except as below noted, all of the income of record of your association. All funds have been duly deposited in the bank and have been with drawn only on warrants issued by the Secretary and signed by the President of the association. The warrants were further supported by invoices or other adequate receipt and by the cancelled bank checks duly signed and endorsed.

The report of the Treasurer does not inelude the income nor many of the disbursements on account of the Journal, which are covered by the separate report of the Editor of the Journal. The transfer of certain funds by the treasurer to the latter to meet the current expenses of the Journal do not, however, enter into the Treasurer's report.

The former Secretary, Dr. Mayo, paid direct to Miss Bertha C. Spencer, on August 20, 1915, the amount of $200.00 which funds did not pass through the hands of the Treasurer. The payment is adequately vouched, however, in a later Treasurer's Warrant covering the balance of the account for professional services rendered.

With these exceptions all income reached the Treasurer in full, and, as stated, is properly accounted for. The following warrants have not been returned to the Treasurer's files and consequently were not presented for audit. The Secretary's records, however, show that the warrants were duly issued and there is other satisfactory evidence of the validity of the disbursements.

WARRANTS MISSING

Warrant No.	Check No.	Check Paid to	Amount
40	47	Dr. W. H. Lynch	$ 8.00
44	51	Dr. E. H. Yunker	10.00
46	53	D. H. Hobos	8.00
47	54	A. A. Cuthberton	8.00
48	55	Jay McDonald	8.00
55	62	Joseph Mosher	8.00
62	69	Dr. S. H. Ward	82.32
89	96	Dr. S. W. Allen	35.00
94	101	G. A. H. Edmiston	3.00
102	109	Dr. U. H. Stewart	4.00
103	110	Dr. Daniel J. Meador	3.00
104	111	Dr. F. R. Wadsworth	3.00
109	116	Dr. C. D. Turney	3.00
112	119	Dr. H. K. Moore	2.00
113	120	Am. Vet. Review for Dr. R. W. Ellis	500.00

WARRANTS NOT RECEIPTED

19	26	Dr. A. Eichhorn	$ 18.62

Supplementing our certificate and the Treasurer's printed report, we present herewith a Summary of Cash Statement which shows in somewhat more condensed form the results of the year's financial operations.

We have been requested to prepare a statement of Financial Condition, including all assets and liabilities of the Association as of date August 7, 1916. Unfortunately, the books, both of the Secretary and of the Treasurer, are records of cash transactions only, and do not take into account the accrued but unpaid assets and liabilities, and our limited time does not permit of a thorough examination into these features. However, with the assistance of the Secretary, we have prepared a tentative statement, which, while not accurate, we trust will satisfy present needs.

HOLLIS, TILTON & PORTE,
By Frederick A. Tilton, C.P.A.

My Certificate dated July 26, 1910.
My Bond expires August 15, 1917.

RECEIPTS AND DISBURSEMENTS
AUGUST 1, 1915 TO AUGUST 7, 1916

RECEIPTS

1915		
August 30,		
Balance in bank as per report of Treasurer Geo. R. White		$ 1,192.27
August 1–19		
Receipts as listed in Secretary Nelson S. Mayo's Cash Book No. 1:		
Balance from July 1915	.25	
From Applications	448.00	
From dues	1,564.75	
From Fob Sales	8.50	
August 22–Sept. 28		
Receipts as listed in Secretary Mayo's Cash Book No 2.		
From Applications	112.00	
From dues	819.00	
From other sources	1.10	
Less checks charged by Bank, account not sufficient funds:		
Aug. 25—$8.00, Sept. 10—$8.00.....	16.00	2,937.60

September 28		
Excess pmt. by Dr. Mayo to Sec'y C. M. Haring Amount as above—$2,937.60, less $200.00 paid to Miss Spencer, $2,737.60. The amount paid over was $2,740.60		3.00
Sept. 12 to Aug. 7, 1916		
Receipts as listed in Secretary C. M. Haring's book and deposited in Berkeley Bank of Savings & Trust Company:		
From Applications and Dues	$7,410.00	
From other sources	2.85	
Less checks charged by Bank, account not sufficient funds:		
October 15—$3.00, Jan. 24—$3.00 and May 19—$10.00	16.00	7,396.85
1916		
Feb. 24		
Interest allowed by Tenth Nat. Bank, Philadelphia account deposits by Treasurer Frederick H. Schneider		4.59
August 2		
Frederick H. Schneider		8.67
TOTAL RECEIPTS		11,542.98
DISBURSEMENTS		
August 30, 1915		
Paid by Dr. Mayo to Bertha Spencer on account reporting Oakland meeting	$ 200.00	
October 15, 1915 to August 2, 1916		
Payments made by Treasurer F. H. Schneider on approved warrants	8,762.37	
TOTAL DISBURSEMENTS		8,962.37
Balance		$ 2,580.61
This balance is made up of:		
Deposit in Tenth Nat. Bank, Philadelphia as certified to by Cashier of the Bank under date August 3, 1916	$1,349.06	
Remittance by Sec'y Haring to Treasurer Schneider Aug. 8 deposited by the latter in Bank Aug. 14 as per Bank Book entry	1,231.55	$ 2,580.61

CLASSIFICATION OF DISBURSEMENTS

An approximate analysis of the disbursements is as follows:

Expenses of Officers and Committees	$ 746.62
State Secretaries' Expenses	140.80
Printing, Stationery, Postage and Clerical	833.87
Secretary's Salary, Dr. Mayo $200.00; Dr. Haring $400.00	600.00
Expense Inspection Educational Institutions	436.33
Payments to apply on purchase of Review	2,000.00
Refund Dues, application fees and subscriptions	70.00
Expense, Legislative Committee	500.00
Flowers for Memorials	20.00
Officers Bonds	18.75
Copies of the Journal purchased	151.00
Expense account Journal	648.85
Revolving fund, Journal	1,300.00
Dr. Fish, Salary	1,000.00
Expense reporting and transcribing records of meetings	496.15
	$ 8,962.37

DELINQUENT AND CURRENT DUES

DELINQUENT

The outstanding dues are distributed, approximately, as follows: (Aug. 1, 1916)

42 Members owe $15.00 each	$ 630.00
47 Members owe $12.00 each	564.00
95 Members owe $ 9.00 each	855.00
80 Members owe $ 6.00 each	480.00
61 Members owe $ 3.00 each	183.00
TOTAL	$2,712.00

CURRENT

Membership per published list in Journal of July 1916:

2,061 at current rate $3.00	$6,183.00
Less paid at date	2,281.00
	$3,902.00

STATEMENT OF FINANCIAL CONDITION

August 7, 1916

ASSETS

Cash on Hand in Bank		$ 2,580.61
Dues Receivable 1911-1912	$ 126.00	
1912-1913	267.00	
1913-1914	552.00	
1914-1915	792.00	

1915-1916	975.00	
1916-1917	3,902.00	6,614.00
Investment—Journal A.V.M.A.		2,000.00
		$11,194.61

LIABILITIES

Expenses of Present Convention
Committee Appropriation
Salary Appropriations
Balance (if any) due on Journal
Deficit (if any) operating Journal
Sundry unpaid Bills
Reserve for uncollectible Dues
Surplus (Capital)

Dr. E. L. Quitman,
Chairman Finance Committee,

We have completed the checking of the accounts of the Editor of the Journal which were presented for audit and submit herewith summary statement of operations, together with Balance Sheet as at July 31, 1916.

So far as the income is recorded in the books, we are able to certify that all receipts of money are properly accounted for, but obviously in our limited time you will not expect us to certify to the completeness of the reported earnings which would involve the examination of the subscription lists, the sold space, rates, etc., data concerning which, in any event, is not at hand.

We have checked all disbursements with the receipts, bills or other vouchers and with the cancelled checks, and found, with a few minor exceptions, that all entries were properly supported.

In attempting to arrive at the financial condition of the Journal, we were confronted with the fact that the books show only the cash transactions and do not take into account the accrued but unpaid accounts whether receivable or payable. Further, in the absence of any definite information as to the number of members of the A.V.M.A. who are subscribers of record to the Journal and of any action as to what portion of the dues is applicable to this service, we have not assumed to show the amount which may be considered as earnings to be paid out of the General Fund.

Assuming the number of members of the A.V.M.A. receiving the Journal to be 1,726 the cost to the General Treasury per mem-

ber is found by dividing the apparent deficit for the period, $2,289.28 by that number, and is $1.33.

The books as kept do not conform to the approved methods of bookkeeping and, while in this instance all important facts concerning cash transactions were ascertained, we would urge the introduction of a proper system of double entry bookkeeping. In this we could undoubtedly be of further service to you or perhaps better an accountant could be found at the place of publication who could give it close attention.

HOLLIS, TILTON & PORTE,
By Frederick A. Tilton, C.P.A.

My Certificate dated July 26, 1910.
My Bond expires August 15, 1917.

AMERICAN VETERINARY MEDICAL ASSOCIATION
RECEIPTS AND DISBURSEMENTS INCIDENT TO THE PURCHASE AND PUBLICATION OF THE JOURNAL
FROM OCTOBER 1, 1915 TO AUGUST 1, 1916

RECEIPTS	EDITOR'S FUND	TREASURER'S FUND	TOTAL
Renewals and Subscriptions	$2,110.02		$2,110.02
Advertising	2,327.76		2,327.76
Miscellaneous	116.81		116.81
Sale of Binders	23.00		23.00
Treasurer A.V.M.A. Revolving Fund	1,300.00	1,300.00	
Unaccounted for	5.58		5.58
	$5,883.17	$1,300.00	$4,583.17
DISBURSEMENTS			
Printing Journal	$3,909.05	$ 454.55	$4,363.60
Postage Pound Rates	158.42		158.42
Postage Stamps	297.46		297.46
Office Clerical	308.70	37.20	345.90
Office Miscellaneous	36.35	44.90	81.25
Miscellaneous Journal	186.35	8.13	194.48
Refunds	41.63		41.63
Binders	14.95		14.95
Half Tones	91.80		91.80
Sundry Expenses	27.89	15.32	43.21
Expenses Committee on Journal		88.75	88.75
Copies of October 1915 Journal		151.00	151.00

Payments on Purchase of the Review		2,000.00	2,000.00
Salary Dr. P. A. Fish		1,000.00	1,000.00
	$5,072.60	$3,799.85	$8,872.45

EDITOR'S FUND

Receipts	$5,883.17
Disbursements	5,072.60
Balance in Bank July 31, 1916	$ 810.57

BALANCE SHEET OF THE JOURNAL JULY 31, 1916

ASSETS		
Good Will, Subscription List, etc.	$2,500.00	
Cash in Bank	810.57	
Accounts Receivable (if any)	?	$3,310.57
LIABILITIES		
Unpaid Bills (if any)	?	
Balance on Purchase of Review	$ 500.00	
Advances from Treasurer's Fund	5,099.85	5,599.85
*DEFICIT 10 months from October 1, 1915		$2,289.28

*To offset the seeming deficit, it should be taken into account that the Journal furnished the paid-up members of the A.V.M.A. with 1726 subscriptions, which according to the decision of the executive and Journal committees were to be paid for at the rate of $2.00 each, making a total of $3,452. This amount to be taken from the dues. As shown in the accountant's statement $2,000, or four-fifths of its purchase price, was also paid to the American Veterinary Review.

SECRETARY'S OFFICE

1827 South Wabash Avenue, Chicago, Illinois.

Dues of 1916.

As much as the executive officers would like to retain your influence as a member, the American Veterinary Medical Association, which is now a legally constituted corporation engaged, among other things, in the publication of a monthly journal, is forbidden by the United States authorities to carry on its roll members who are in arrears, unless such members signify in writing their intentions to pay their dues at some future time.

Will you not please, therefore, remit the dues of 1916, and thus relieve us of the very unpleasant duty of removing your name

from the membership list? This is not an appeal for pecuniary assistance as the association is on a sound financial footing. It is a plea for your moral support and an appeal to your patriotism.

Did you ever think what a worthless, slipshod non-entity the veterinary profession in America would be were it not for the inspiring influence of the A.V.M.A.?

Whether or not during your busy professional life you have ever given the matter a thought it must seem plain when your attention is called to it that the day is here when the veterinary profession must show a strong front, and since it is only through a big nation-wide organization that a strong front can be maintained, the loss of your support as a member is not a trivial matter. The nation needs this organization and the organization in turn needs you. We are to-day as a profession confronted with the necessity of showing our ability to promote, protect and conserve our greatest national resource—the live stock industry. If we fall short in this connection others, already in the field, will do it for us; we are at this very moment being consulted by our national officials about our qualifications as veterinarians, our willingness to serve our country in case of war and the number of available men we have; besides we are face to face with the problems of raising our standard of matriculation, of education and of ethics; all of which can only be accomplished by a solidly united profession, determined to improve its morale.

CONCESSION IN RATES TO THE ANNUAL MEETING

The Central Passenger Association which includes all of the railroads east of the Mississippi and north of the Potomac have made a concession of 2c per mile for our annual meeting at Kansas City, the selling dates being August 17th, 18th and 19th, and the return date has been set at August 29th. The Southeastern Passenger Association, which covers the same territory south of the Potomac, although at first refusing our request, has agreed to reconsider its action at a meeting of the representatives of the different railroads to be held at New Orleans, April 18th. I am sure from one of the letters last received from the secretary of this association that a favorable action may be expected, and that our southern members will not again be discriminated against in this connection. With the assistance of Dr. Burson, state secretary for Georgia, we have endeavored to show the railroad officials of this

section of the country that a help to the A.V.M.A. will in turn help them.

As regards the Pacific Coast we have been promised "BACK EAST" excursion dates for August 16th and 17th, although the official action in this connection will not be taken until sometime during April. If we should be successful in having these dates fixed, low rates will be assured from every part of the country.

CORRECTIONS

In the March issue of the *Journal*, through an error of ours, the name of W. Horace Hoskins was omitted as secretary-treasurer of the Salmon Memorial Committee; that of M. H. Reynolds as secretary of the International Commission on Bovine Tuberculosis; and that of M. P. Ravenel as a member of this commission. The Army Veterinary Service should replace the title of Army Organization.

L. A. MERILLAT.

NEW YORK CITY VETERINARY MEDICAL ASSOCIATION

OCTOBER MEETING. The first regular monthly meeting of this association following the summer recess was held October 11th, 1916. A clinical program was very successfully carried out during the afternoon at Berns Veterinary Hospital, 74 Adams Street, Brooklyn, N. Y. Dr. John Adams, professor of surgery at the University of Pennsylvania was present and took an active part in the surgical clinic. The following cases were presented for examination and operation. 1. Horse—Bone Tumor, size of fist on upper *maxillary* bone, just above incisor teeth, pushing upper lip up out of shape—presented by Dr. E. Hanshew as an interesting condition. Two incisor teeth missing and they may be the nucleus of this growth.

2. Horse—Healed quittor, six months after operation—presented for examination by the Berns Veterinary Hospital.

3. Horse—Quittor. Two weeks after operation—presented by the Berns Veterinary Hospital for examination.

4. Horse—Quittor—inside of off hind foot complicated with quarter crack. Presented by Dr. E. B. Ackerman, operated by Dr. R. W. Gannett, assisted by Dr. Schuppan. The Bayer method as described by Dr. W. L. Williams was modified, in that the anterior portion of the V-shaped incision was continued in the laminae

up to but not through the scar tissue filling the fissure in the coronary band at the seat of the quarter crack. The entire lateral cartilage was removed. It showed extensive necrosis. To prevent a recurrence of quarter crack the isolated portion of the coronary band, posterior to the above mentioned fissure, was excised. The horse walked home directly after the operation.

5. Horse—Lame, forward-hitting on heel like old founder case—looked as if he might have dropped sole and seedy toe but this was not the case. Presented for diagnosis, probably a keraphyllocele caused by calk wound. Presented by the Berns Veterinary Hospital.

6. Horse—Paraphymosis—presented for operation by Adams Method. Had improved so much under treatment that operation at this time was considered unnecessary.

7. Femoral Paralysis and Atrophy following an attack of Azoturia. Seven months standing.

8. Another of the same of one months duration—both of these cases are improving but not much difference in the two for the length of time after the disease and shows how slow the improvement is for the first few months and how rapidly recovery takes place after they pass a certain stage. The first case was treated by injecting rectified turpentine in tissue but found to be of little value. These cases were also presented by the Berns Veterinary Hospital.

9. Horse—Very large forearm involving elbow joint. Bony, opened—discharge of bloody serum. Probably osteo sarcoma. Prognosis: very unfavorable, recommended destruction. Presented by Berns Veterinary Hospital for diagnosis.

10. Horse—Granulomata of Eyeball. Growth from sclerotic coat of eye. Probably involves inner coats. Had been removed but returned. Very likely of a cancerous nature. Removal of entire eyeball will be the only cure. Presented by Dr. R. W. Ellis for diagnosis and operation.

11. Pony—Brought from New York in Ford Touring Car. Slough of the right hind hoof, whole hoof coming off, no cure; destruction recommended—destroyed. Post-mortem showed fracture of the os-pedis. Presented by Dr. L. Griessman for diagnosis and operation.

12. Horse—Fistula of withers. After operation—presented by Dr. Magee.

13. Horse Lame—Right front foot. For diagnosis. Navicular disease or low ring bone. Concensus of opinion was the latter. Presented by Dr. Stark for diagnosis.

14. Horse—Suspected roarer—presented by Dr. Ackerman for diagnosis and operation if necessary. Exercise proved him to be a roarer and Prof. John Adams operated.

15. Horse—Cold abscess—presented by Dr. Ackerman. Not operated on for lack of time.

16. Bull dog. Hodgkin's Disease, pseudo leukemia, progressive hyperplasia lymphatic glands, associated with anemia.

17. Bitch. Paralysis—for diagnosis and operation or whatever necessary. Diagnosis: Pus in the Fallopian tubes, diseased ovaries, etc. Diagnosis by Drs. Gill and Blair—operated on by Dr. Gill.

18. Puppy. Swallowed seven-inch hat-pin head first, came out through neck. Operated on by Dr. Gannett who opened the esophagus.

19. Head and viscera of a bullock showing lesions of generalized actinomycosis. These specimens were saved for the meeting by Drs. Danziger and Krocher, Veterinary Inspectors for New York City Health Department.

There were several other interesting cases left that were not examined or discussed for lack of time. The members and guests then adjourned to the Hotel Bossert where an excellent dinner was served and enjoyed by all. President Goubeaud opened the postprandial part of the program by introducing Dr. T. E. Smith as toastmaster. Dr. Smith, after a few well chosen remarks, introduced Dr. John Adams as the principal speaker of the evening who made an interesting and instructive address. The doctor gave some interesting experiences of his own career as a veterinarian and said, in part, that it is essential that a surgeon must be familiar with the general principles of anatomy and cultivate mechanical dexterity. Recommended the use of a few instruments. Also urged the veterinarians to be honest in all their dealings and thereby command the respect of their clients and the public as a whole. Dr. J. G. Wills, Chief Veterinarian, Department of Agriculture and President of the New York State Veterinary Medical Society also made a brief address and said that these gatherings of veterinarians are important not only for the exchange of views and discussion of interesting cases and conditions but, for the social spirit

engendered and the friendships made. Said that the membership of the State Society should be greatly enlarged as only about one-quarter of the legally registered veterinarians in the state are members.

Dr. Smith, before introducing the next speaker, spoke of the election of a delegate to the A.V.M.A. and Dr. Ellis, when called upon to speak, followed up Dr. Smith's remarks by suggesting that it would be well to decide on a representative veterinarian from this district.

Dr. H. D. Gill spoke of the experience gained in the years of his practice and said as years pass, one realizes the need of friends. Urged that we organize properly and work together. Dr. W. Reid Blair also made a few remarks. Dr. George H. Berns gave some interesting accounts of his practice in Brooklyn since 1879 when he first started to practice at the same address as the Berns Veterinary Hospital still occupies. Said at that time there were only one or two other qualified practitioners in the city. A rising vote of thanks was extended to Dr. Adams, Dr. Wills and the Berns Veterinary Hospital for their efforts in making this meeting one of the most successful ever held by this association. Fifty-six members and guests were present at the dinner. It was announced that the Massachusetts Veterinary Society would hold a large meeting on October 18th and as many as could do so were urged to attend. The president was empowered to appoint a committee. The program committee also announced that Dr. V. A. Moore of the New York State Veterinary College was expected to address this association at the November meeting.

NOVEMBER MEETING

The regular monthly meeting of this association was called to order by the president, Dr. Goubeaud, in the lecture room of the Carnegie Laboratory at 8:45 P. M.

Drs. Cochran and Gannett gave a brief report of the work and financial condition of the prosecuting committee. Gave a brief report of a recent case in which evidence had been obtained but owing to a technicality the judges dismissed the defendant.

Dr. Gill suggested that the veterinary law be referred to the State Educational Department and the Attorney General.

Dr. Gill then asked for a report regarding the complaint made against Dr. Kingston as employing a non-registered assistant.

Dr. Gannett stated that such complaint had been made to the commissioner and referred to Dr. Gill.

Dr. Kingston who was present stated that he is a member in good standing of this association, and employed a man to do nursing work under his personal direction. Also said that under the circumstances he felt that he should have been notified before any action was taken.

Dr. A. G. Hall of Earlville, N. Y. was then introduced and gave an interesting talk on "Some of the Common Diseases of Cattle." The doctor mentioned some of the common udder troubles met with in dairy cattle. Hoof rot was also mentioned and is treated with clear carbolic acid and alcohol is then applied. Iodin is also used. Highly recommends placing lime at the sill of the door where cattle enter the stable.

Pneumonia is treated along the same lines as in the horse. In uterine troubles such as inflammation of the uterus and slight cases of peritonitis inject two or three ounces of sulphuric ether.

In cases of retained placenta does not recommend the removal of the same. Oil of savin in two dram doses is administered night and morning. Iodoform in capsules is introduced into the uterus. Sulphuric ether is also used. Garget in its incipient stage is detected by the use of fine mesh screen on milking pail. Recommends dipping teats in mild antiseptic solution.

In cases of acute mammitis good results have been obtained by applying a bran sack stuffed with cotton and kept wet with hot water.

In the control of tuberculosis the doctor also recommends the use of the individual manger and drinking cup.

Dr. Way announced that Dr. G. A. Knapp of Millbrook, N. Y. had expected to be present and read a paper but had been unavoidably detained. However, Dr. Knapp had forwarded the manuscript and Dr. Way read his paper which was entitled "Experiences in the Control of Infectious Diseases in a Large Herd."

This was an excellent paper and dealt in detail, giving facts, dates and figures of his experiences in one of the largest herds in the state.

Dr. V. A. Moore, Dean of the New York State Veterinary College, then gave an excellent address on "Diagnosis, Control and Eradication of Infectious Diseases."

Dr. J. G. Wills was requested to open the discussion of the

papers and said, in part, that he had been in close touch with the work done by Dr. Knapp and thoroughly agrees with him that segregation is a necessity in the control of infectious and contagious diseases.

Individual mangers and drinking cups cannot but help to cut down the danger of infection. Also spoke very highly of Dr. Moore's paper.

Dr. Gill also stated that he was much pleased and interested to have listened to such excellent papers.

Among others who entered into the discussion were Drs. Berns, De Vine, Chase, and Blair.

The association tendered a vote of thanks to the contributors to the program of the evening and the secretary was, on motion, instructed to acknowledge Dr. Knapp's paper.

The program committee announced that at the December meeting a discussion of the cases operated on at the October meeting would be held. ROBERT S. MACKELLAR, Secretary.

THE NORTHEASTERN INDIANA VETERINARY ASSOCIATION

The regular meeting and annual clinic of the Northeastern Indiana Veterinary Association was held at Muncie, Indiana, February 13th.

The afternoon was given over to the clinic which was held at Dr. Boor's hospital. A number of operations and demonstrations were performed; among these, demonstrating the single rope method of raising an animal, by Dr. C. C. Dobson; radical operation for poll evil by Dr. Boyd and Dr. Hadley; operation on dog, by Dr. Leach; operation on a broken shoulder on a horse, by Dr. Boyd; ovariotomy, by Dr. Boyd.

After the clinic a fine dinner was served at the Delaware Hotel. The meeting was called to order in the same hotel by Dr. Stoker, president. The minutes of the last meeting were read and approved. A motion to revise the mailing list and by-laws was carried. A paper by Dr. F. A. Bolser read by Dr. Rogers on differential diagnosis of hog cholera, resulted in much interesting discussion, and many important points were brought out. Paper by Dr. Boor on proposed legislation was read and heartily endorsed by those present.

Applications received: Drs. C. C. Allen, Selma; Claud Weber, Oakville; C. C. Sheiler, Eaton; F. A. Moore, Gaston; J. C. Rodgers, Anderson; C. C. Dobson, Muncie, all of Indiana.

Motion to adjourn and the next meeting to be held at the Wayne Hotel, Ft. Wayne, Ind., March 13th.

R. H. Boyd, Secretary.

THE SAGINAW VALLEY VETERINARY MEDICAL ASSOCIATION

The registered graduate veterinarians of Saginaw and Bay Counties met at the West Side Business Men's Association rooms, Saginaw, Mich., March 1st, and the Saginaw Valley Veterinary Medical Association was formed.

It is the intention of the members to get the veterinarians of the surrounding counties to come into the fold and help make this a real association.

Dr. G. W. Dunphy, State Veterinarian and Dr. H. M. Newton, Federal Veterinarian in charge of hog cholera control in Michigan were the instigators of this meeting and were both present to assist in framing things up.

The association is formed for the purpose of advancing the interests of the profession generally and to promote a closer relationship among the valley veterinarians. It will co-operate with the County Agents and State Live Stock Sanitary Commission in the control of contagious diseases.

The officers elected were: President, Dr. William Brooks, Saginaw; Vice-President, Dr. G. W. Cronkite, Saginaw; Secretary-Treasurer, Dr. M. P. Hunt, Frankenmuth.

Board of Directors: Dr. H. D. Monroe of Pinconning for one year; Dr. George H. Carter of Saginaw for two years; and Dr. Ducey of Merrill for three years.

Executive Committee: Dr. J. H. Donald of Bay City; Dr. C. M. Culbert of Chesaning; and Dr. John Russell of Saginaw.

Another meeting of the association will be held in Saginaw in two weeks at which time by-laws will be adopted and a permanent organization perfected. M. P. Hunt, Secy.-Treas.

KEYSTONE VETERINARY MEDICAL ASSOCIATION

The regular monthly meeting of the Keystone Veterinary Medical Association was held on Tuesday evening, March 13th, 1917, at Philadelphia, Pa. Large attendance.

The program for the evening was as follows:

The Physical Examination of Dairy Cattle for Tuberculosis by Dr. Victor G. Kimball.

The Veterinarian and the Agriculturist by Dr. D. E. Hickman.

The Remedy Comes from Within by Dr. Charles H. Duncan of New York—Discoverer and Founder of Autotherapy.

These subjects were thoroughly discussed by several of the members. C. S. ROCKWELL, Secy.-Treas.

THE NORTHWESTERN OHIO VETERINARY MEDICAL ASSOCIATION

The meeting was called to order by President Hover. The minutes were read by Secretary Hershey and approved. The report of N. D. Backus as chairman of the auditing committee was accepted.

The following officers were elected: President, Dr. Harry Fulstow, Norwalk; Vice-President, Dr. W. E. Meyer, Fostoria; Secretary-Treasurer, Dr. C. E. Hershey, Tiffin.

After an interesting address by the president the following program was given:

Poisoning by Castor Oil Bean ..... F. A. Young
Colic—Its Complications ..... A. C. Schafstall
Removing Retained Placentae by injecting Placental Vessels with Saline Solution ..... R. R. Shaw
Some New Therapeutic Suggestions ..... N. S. Mayo
Oophorectomy of Sows ..... C. L. Jones

The paper on the Milk Supply of Small Towns which was to have been given by Dr. Sheets was not presented but the subject was discussed by Dr. Merillat.

The address of Dr. Adams of Philadelphia was devoted to the paralysis of the penis; quittor; poll evil and roaring. The papers brought out good discussions and much interest was manifested.

Nine new members were elected. At the suggestion of Dr. Gibson, it was voted that the next meeting be held at Detroit with the Michigan Association.

At the banquet an address was given by Dr. R. C. Longfellow of Toledo. After-dinner speeches were also made by Drs. Mayo, Adams, Merillat and Newton.

COMMUNICATIONS

"SERVICE"

Editor Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

After reading the editorial on "Service" in the March issue of the *Journal* of the Americal Veterinary Medical Association, I can not refrain from commenting on the same, especially since, in my opinion, a professional or scientific publication is not the proper channel for discussions as contained in that editorial.

No one can take exception to anyone showing favoritism in the Great War. It is the privilege of all to have feelings in the matter and even to express them. Furthermore, with the severance of the diplomatic relations and the possibility, or even probability, of our country going to war with Germany, every American should be impressed with the duty he owes to his country. It is likewise perfectly proper and patriotic to urge those who ought to be reminded of these obligations, and for a veterinary journal to stimulate the members of the profession to contribute their bit in one field or the other.

But these ought to be and should be the limitations of a professional or scientific journal.

The writer of the editorial in his introductory statement has amply expressed himself with regard to the turn of events and his subsequent discussions are entirely superfluous and uncalled for. It is gratifying that to date the professional and scientific publications of the neutral countries and even those of France, Austria and Germany, have properly abstained from any inferences as to the political and other conditions of the war, and confined themselves to the professional and scientific topics which developed in the course of events.

It would have been proper for the writer of the editorial to confine himself within such limits and abstain from definitions of patriots, traitors, etc. Such information we obtain from the daily press and from political magazines and as a matter of fact they are the proper medium for that sort of reading matter.

If the writer had started his article with the third paragraph on page 798 it would have been a very appropriate editorial for the critical times that are confronting us. But it is regrettable that he allowed himself to be swayed by his enthusiasm to the detriment and against all propriety of the official organ of the American Veterinary Medical Association. We are not yet at war! At least we were not at the time the editorial was written and we might some day regret that we published the editorial in question.

In conclusion permit me to state that in making this comment I have not been prompted by any pro-German sympathies. I am an American by choice and in need I am ready to offer my services to my adopted country.

March 7, 1917. Very truly yours,

A. EICHHORN.

[The writer of the editorial on Service, although of German descent, is an American before he is an editor. He believed, and still believes, the editorial dealt with *facts* and that it is not "regrettable" for any scientific or professional man to possess patriotism or to demonstrate it.]

POSITION IN COLOMBIA

Editor Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

The following is a copy of a cablegram left with me by the secretary of the Colombian Legation in this City:

"It is very urgent consulting Department of Agriculture if it would be possible to find an expert veterinarian with enough experience that may come to tropical climate as professor with residence there. Please wire terms and conditions of contract." (Signed) Minister of Agriculture of Colombia.

I was unable to suggest to that Government the name of a veterinarian to fill the position which they have. Whoever replies should have a knowledge of Spanish as that is the language of the country. Evidently it is the expectation of that country to establish a veterinary school. I would expect that this position would carry a salary of $5,000 in gold including transportation. As this information may be of some value to some of your readers, I am transmitting it in order that you may carry it in your next issue.

Very truly yours, A. D. MELVIN, Chief of Bureau.

ANOTHER "SIR KNIGHT" ADDED TO THE PROFESSION

Editor Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

In the recent list of honors conferred by King George, of Great Britain, is one of more than passing interest to the Veterinary Profession generally, and more particularly perhaps to those in this country who have been devoted to the upbuilding of our own Army Veterinary Service. The writer refers to that of K.C.M.G. (Knight Commander of the Order of St. Michael and St. George) conferred on Hon. Major-General Robert Pringle, Director-General of the British Army Veterinary Department. But while it is the latest, it is by no means the only, honor given him by his Sovereign for meritorious service rendered.

Sir Robert Pringle has had a distinguished career in the service of his country. He joined the British Army Veterinary Department in 1878, and later saw much service in India and elsewhere. In the Afghan War in 1879-80 he served with distinction and was awarded the medal. In the Wazeree Expedition of 1881 he was mentioned in despatches, and he took part in the Zhob Valley Expedition in 1884. He was commended for an exhaustive report on the treatment of camels in India. In 1900-1901 Pringle

served in South Africa, was again mentioned in despatches, and was awarded the medal and three clasps. If we are not mistaken, it was after his service in South Africa that he received the D. S. O. (Distinguished Service Order) medal. In 1902 he was promoted to Veterinary Lieut.-Colonel. In 1907 he rose to the rank of Veterinary Colonel; and in 1909, was made a C. B. (Companion of the Order of the Bath); and some little time before the present war broke out, he attained the highest position in the service, viz., that of Director-General, with the rank of Major-General, which he has held up to the present time, with its heavy burden of responsibility, and which has no doubt merited for him this later distinguished honor of Knighthood.

We in this country do not take much stock in titles such as those referred to, for the reason, perhaps, that we do not fully realize what they stand for; but to the British officer, in whatever branch of the Service he may be, they really mean a great deal, as they are conferred on those only who have rendered some real service to their country.

Sir Robert Pringle is a man of about 62 years of age, and a "Scot," whom the writer has known since early boyhood. Although in active service at the present time of course, he is a member of the Council of the Royal College of Veterinary Surgeons, London.

Naturally the writer is proud not only of the early companionship, but of the distinguished veterinary career, of the new Knight, which has been recognized by so many well-merited honors having been conferred on him for valuable services to his country; and we believe the profession, generally, will join in wishing Sir Robert many more years of usefulness, and, afterwards, happiness in his retirement.

W. H. D.

THE COUNTY AGENT

Editor Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

From time to time veterinarians in different parts of the country have protested against the activities of the county agent. Undoubtedly they have been justified in most instances, for the men engaged in the work are often inexperienced and lack the proper training.

In one county in Ohio the authorities were fortunate in selecting a man to act as agent who combined the training of the veterinarian with that of the agriculturist. That he has been successful is shown by the following article by John Gould which appeared in a recent number of *Hoard's Dairyman:*

'There has been and even now is, much discussion pro and con about the efficiency of the county agent. Many claim the office is not paying its keep, but in this county, (Portage county, Ohio),

there is little criticism and Dr. Miller seems very popular, notably among the dairymen who dominate fully half of the county. This county was the very first in the state to establish what is now a very general custom, and was very fortunate in securing an agent, who, both in theory and practice, was a most successful farmer as well as a veterinarian of large practice. From the start, the doctor has been wide-awake in promoting the dairy interest of his clients. As adviser of the County Improvement Association he selected quite a score of bulls of the dairy breeds and placed them in suitable locations for the free use of the dairymen. Great stress was laid upon dairy rations, what were the most suitable and economical, where they could be purchased, and their composition.

"The idea of dairy association was made prominent, notably in the selling of products and the buying of feeds, showing the value of co-operative effort over individual helplessness. To this end he was instrumental in forming some three cow testing clubs, and when the recent conflict was ripe between the dairymen and the city milk dealers, he was a very large factor in forming four auxiliaries of the Northern Ohio Dairymen's Protective Association. The doctor has also given many public and private demonstrations of the Babcock test, besides visiting many dairy farms and giving much advice and in the selection of dairy cows. He has talked alfalfa from end to end of the county as a great ration to save buying so much high priced protein, as also silo building and how to grow mature crops for it. He has held each year an institute in every township in the county. He organized a fertilizer club in every town and this has resulted in a yearly buying of 2,500 tons of fertilizers by the club at a saving of over $4 per ton. He was also instrumental in the buying of untold carloads of lime at reduced rates, because as well as the fertilizers they were paid for at the car door instead of being "timed and noted" for future payment. For three years Dr. Miller has kept "something doing" all the time, from boys' clubs to girls' contests, with a score of other items, but none more important than his work for the dairy industry of the county; and it is no more than a duty and a pleasure to note and comment upon them for the Dairyman."

This case illustrates very clearly the desirability of introducing more agricultural work in the curriculum of the veterinary college, also more veterinary work into that of the agricultural college.

Veterinary faculties should realize that the position of county agent, although a new field for veterinary graduates, is one that in the future is bound to expand. It seems to the writer that these faculties should anticipate the demand for men adequately trained in the science of veterinary medicine and the art of agriculture, and provide combination courses of study especially designed to fit the needs of such men.

Yours very truly, F. B. HADLEY,
Professor of Veterinary Science.

REVIEWS

A PRACTICAL MEDICAL DICTIONARY

THOMAS LATHROP STEDMAN, A.M., M.D.
Fourth Revised Edition. Illustrated. William Wood & Co, New York, N. Y.

This work with a short appendix on weights and measures, symbols, etc., contains 1102 pages. That medicine is a progressive science is shown by the fact that nearly two thousand new words here make their appearance, since the last edition was published two years ago. Although the term medical might be inferred by many to limit the use of the work to physicians, the author has considered it in its broadest sense to include veterinary medicine, as well as dentistry, chemistry and biological science in general. To veterinary students a work of this kind is well nigh indispensable. To the progressive veterinary practitioner it is equally indispensable; for in recent years veterinary science has made rapid progress and new terms as well as new methods have been introduced.

In some dictionaries it has appeared that conciseness of the definition has been sought rather than clearness, with consequent dissatisfaction to the consultant. In the present work clearness has apparently been the main object although conciseness has not been ignored. There are numerous plates, figures in the text, lists, etc., which add much to convenience of reference. The work is a credit to both author and publisher. P. A. F.

MICROBIOLOGY; A TEXT BOOK OF MICROORGANISMS GENERAL AND APPLIED

Edited by Charles E. Marshall and written by twenty-five contributors.
186 Illustrations and 1 colored plate. Second edition revised and enlarged.
P. Blakiston's Sons and Co., Philadelphia, 1917. XXIV + 900 pp.
Price $3.00 Net.

This volume consists of a series of systematically arranged articles on wisely chosen topics in microbiology prepared by many writers. As stated by the editor, the primary purpose of this text book is to place in the hands of college students an elementary, technical treatise of the subject matter included. The scope of the book is wide as will be indicated by the appended table of contents. The preparation is somewhat unique in that the editor has

secured men recognized in their respective fields to prepare the different chapters. On this account the book is supported throughout by the prestige of special authority and on that account it is of exceptional value.

It is divided into three parts. I. Morphology and culture of microorganisms. II. Physiology of microorganisms. III. Applied microbiology.

Part I contains 6 chapters on bacteria, molds, yeasts, invisible viruses and protozoa.

Part II contains 3 chapters on nutrition and metabolism as follows: Food of microorganisms; products of metabolism; and mechanism of metabolism. It has 5 chapters on physical influences such as moisture, temperature, light and other rays, electricity and mechanical effects. Two chapters on chemical influences first, those producing stimulation of growth and second those causing inhibition of growth. The fourth division of this part contains an interesting chapter on symbiosis, metabiosis and antibiosis.

Part III takes up the general role of bacteria. There are 2 chapters on the microbiology of air; 2 chapters on the microbiology of water and sewage; 4 on the microbiology of soil; 4 on the microbiology of milk and milk products; 11 on the microbiology of special industries; 5 on the microbial diseases of plants; 1 on the microbial diseases of insects; 3 on the microbiology of the diseases of man and of domesticated animals; and one on the control of infectious diseases.

A book in which such a wide variety of subjects is discussed, each by a specialist, cannot help but be authoritative and, on the other hand, we cannot expect that so many topics can be extensively elaborated in so short a space. The book, therefore. is of unusual value to the student in general bacteriology or to those who have this wide interest in the subject and it is for such that it is designed rather than for those who are taking up any particular line as a specialty. The authors have very successfully set forth the fundamental knowledge and the guiding principles of microbiology to fit into and to prepare one for special work in any of the special fields into which microbiology has penetrated.

One finds in this book many subjects that are rather briefly discussed but on the whole it is doubtful if any author could bring so much valuable information, on so large a number of topics, into a shorter space. As a text for beginners in bacteriology it is rather

large but for advanced students or as a reference book on the general subject for those who are engaged in special lines of bacteriological work, it is to be highly commended.

There are a number of statements concerning which there may be differences of opinion. As a rule, however, the subject matter is well chosen and presented in a clear and concise manner. A carefully selected list of references to the literature on the researches in the various subjects discussed would have added much to its value for advanced or professional students. The illustrations are good and instructive. V. A. M.

DISEASES OF THE DOG

FRANK TOWNSEND BARTON, M.R.C.V.S. (Captain A.V.C.)
The MacMillan Co., New York, N. Y. Price $1.50.

This is a book of 247 pages divided into 19 chapters. Among the various chapters are those on: aids to the treatment of sick dogs, including administration of medicine and doses; canine pharmacy; detection of disease; diseases of the different systems of the body and one on wounds and their treatment.

The author has covered considerable ground in a popular manner but has not endeavored to make every owner a "doctor". Concerning this the author states in the preface—"Diseases of the Dog and Management is primarily intended to serve as a first aid for those who have the charge of dogs either in health or sickness. It is not always convenient to obtain professional assistance, but when such aid is within reach it should always be obtained as speedily as possible, as unskilful treatment, no matter however well directed, frequently leads to disappointment and much useless suffering to the patient. .... There are minor ailments and accidents which can be effectively dealt with by the novice, and the author has endeavored to incorporate in this work the needful instructions for carrying out the elementary principles of canine medicine and surgery."

The author has kept pretty well to his purpose and frequently recommends the employment of a veterinarian. The book may be interesting to veterinarians but must not be considered as a text on the subject. H. J. M.

NECROLOGY

JEAN BAPTISTE AUGUSTE CHAUVEAU
1827–1917

An Honorary Member of the American Veterinary Medical Association.

FRANCIS DUNCAN

Dr. Francis Duncan of Ithaca, Michigan, died at his home January 5, in his forty-seventh year, after an illness of long duration. Dr. Duncan was born in the province of Ontario in 1870. He was a graduate of the Ontario Veterinary College of the class of 1895. After a period of service as an inspector with the Canadian government, he settled in Ithaca, Mich. A wife and four children are left to mourn his loss.

Dr. Duncan was a member of the Independent Order of Foresters and of the Masonic Order. He became a member of the A.V.M.A. at the Detroit meeting in 1916.

MISCELLANEOUS

—The next meeting of the Kentucky Veterinary Medical Association will be held at Shelbyville, Ky., June 20 and 21.

—Dr. Thomas P. Haslam, for three years assistant professor of Veterinary Medicine at the Kansas State Agricultural College in charge of research work, has resigned to take charge of the manufacture of blackleg and some other biological products at the Purity Biological Laboratories at Sioux City, Ia.

—Dr. Richard H. Power, veterinarian of the 5th Field Artillery has been transferred from Camp Fort Bliss, Tex. to Fort Riley, Kansas.

—Dr. H. V. Cardona has removed from Chicago, Ill. to Milbank, So. Dakota.

—Dr. F. N. Davidson has removed from Buhl, Ida. to Tecumseh, Nebraska.

—Dr. J. M. Twitchell has removed from Nashville, Tenn. to Center, Colo.

—Dr. P. C. Guyselman has removed from Monte Vista to Montrose, Colo.

—Dr. A. R. Galbraith has sold his practice at Garfield, Washington and will locate at Pendleton, Oregon.

—The next meeting of the North Carolina State Veterinary Medical Association will be held at Charlotte, N. C., June 26 and 27.

—It is reported there are fourteen vacancies for Veterinarians in the U. S. Army under the legislation of last year. The next examinations will occur on July 2.

—Dr. Raymond C. Reed, formerly at the Experiment Station at Newark, Del., has gone to the Maryland College of Agriculture at College Park, Md., as head of the Department of Animal Industry and in charge of the Control work for the State Department of Agriculture.

—Dr. H. C. Johnson has removed from Adel to Linden Ia.

—Dr. W. C. Van Allstyne, Veterinarian of the 10th Cavalry is stationed at Ft. Huachuca, Arizona.

—Dr. G. E. Corwin has removed from Hartford to 87 North Whittlesey Ave., Wallingford, Conn.

—Dr. F. S. Jones of the Rockefeller Institute of Medical Research, Princeton, N. J. and Dr. J. T. Arnold of New York have returned from Patagonia, So. America, where they have been engaged for some months in studying a disease of sheep.

—The marriage of Dr. C. A. Roig of Poughkeepsie is announced.

—The new officers of the Indiana Veterinary Association are Dr. A. F. Nelson, President; Dr. J. W. Klotz, Treasurer and Dr. G. H. Roberts, Secretary.

—The Veterinary Medical Association of the Veterinary College of George Washington University held a banquet in February at the Continental Hotel, Washington, D. C. Among the speakers were Rear Admiral C. H. Stockton, J. A. T. Hull of Iowa, Dr. C. W. Stiles of the U. S. Public Health Service, and G. M. Rommel of the Bureau of Animal Industry. Dr. J. P. Turner officiated as toastmaster.

—Legal Protection Against Hog Cholera. A case of particular interest to farmers, veterinarians, and dealers in live stock has been on trial during the past two weeks in Pennsylvania before Judge Stewart and a jury in the Northampton County Court. On March 25 and April 15, 1916 the defendant, H. C. Kramlich, an extensive dealer in live stock at Northampton, Pa., offered 850 hogs at public sales. Shortly after the sales, agents of the Pennsylvania State Livestock Sanitary Board found a number of the hogs dying from hog cholera on seventy-two farms of purchasers in Northamp-

ton and Lehigh Counties. The losses aggregated about 400 head including swine previously owned on the farms which became infected from animals purchased at the sales.

The Board promptly vaccinated a large number of hogs which had been exposed to this infection. Investigation conducted by the State Veterinarian showed that the hogs were infected with cholera when Kramlich shipped them from Cumberland County, Pa. to his sales at Northampton and ordered prosecution under the livestock law which forbids the sale of animals affected with a transmissible disease.

The case was bitterly contested and attracted the attendance of a large number of farmers and livestock dealers throughout the two weeks' trial. It resulted in a victory for the Board as the jury returned a verdict of guilty. The cost in the case will be heavy as there were about eighty witnesses in attendance, including a number of veterinarians who gave expert testimony. The purchasers may bring suit against Mr. Kramlich to recover their losses.

The Board is determined to protect the farmers and livestock interests in Pennsylvania from unscrupulous or careless dealers who spread dangerous diseases among animals. This case was the first of its kind under the livestock law and it is believed that much good will result from a conviction.

—VIVISECTION. The following resolution has been sent by a committee of the Silver Bow County Medical Society of Montana to their representative in Washington:

Be it resolved by the Silver Bow County Medical Society that we reaffirm our belief in the great and lasting value of the advancements in medicine and surgery accruing from animal experimentation:

That we condemn an act on the part of our representative in Congress which may tend in any way to lessen the quantity or lower the quality of this kind of work by scientists in the United States Department of Agriculture and the Public Health Service.

In an additional statement attention is called to the great benefit that has been and is being derived from the use of preparations, involving animal experimentation, in such maladies as black leg, contagious abortion, tuberculosis, etc. Also that animal experimentation is necessary, in many instances, in protecting the health of animals and man against epizootics or epidemics that may be introduced into this country from foreign sources.